Biological Services Program

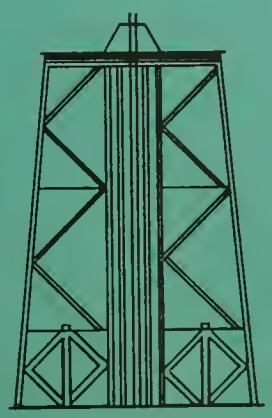
FWS/OBS–77/16.4
March 1978

Environmental Planning for Offshore Oil and Gas

Volume V:

Regional Status Reports

Part 4: California



Fish and Wildlife Service

U.S. Department of the Interior

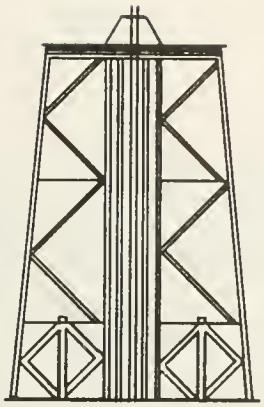
The Biological Services Program was established within the U.S. Fish and Wildlife Service to supply scientific information and methodologies on key environmental issues that impact fish and wildlife resources and their supporting ecosystems. The mission of the program is as follows:

- To strengthen the Fish and Wildlife Service in its role as a primary source of information on national fish and wildlife resources, particularly in respect to environmental impact assessment.
- To gather, analyze, and present information that will aid decisionmakers in the identification and resolution of problems associated with major changes in land and water use.
- To provide better ecological information and evaluation for Department of the Interior development programs, such as those relating to energy development.

Information developed by the Biological Services Program is intended for use in the planning and decisionmaking process to prevent or minimize the impact of development on fish and wildlife. Research activities and technical assistance services are based on an analysis of the issues a determination of the decisionmakers involved and their information needs, and an evaluation of the state of the art to identify information gaps and to determine priorities. This is a strategy that will ensure that the products produced and disseminated are timely and useful.

Projects have been initiated in the following areas: coal extraction and conversion; power plants; geothermal, mineral and oil shale development; water resource analysis, including stream alterations and western water allocation; coastal ecosystems and Outer Continental Shelf development; and systems inventory, including National Wetland Inventory, habitat classification and analysis, and information transfer.

The Biological Services Program consists of the Office of Biological Services in Washington, D.C., which is responsible for overall planning and management; National Teams, which provide the Program's central scientific and technical expertise and arrange for contracting biological services studies with states, universities, consulting firms, and others; Regional Staff, who provide a link to problems at the operating level; and staff at certain Fish and Wildlife Service research facilities, who conduct inhouse research studies.



FWS/OBS-77/16.4
March 1978

Environmental Planning for Offshore Oil and Gas

Volume V: Regional Status Reports

Part 4: California

by

Ruthann Corwin and Patrick H. Heffernan
School of Architecture and Urban Planning
University of California at Los Angeles

Prepared for
The Conservation Foundation
1717 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Contract No. 14-16-0008-962

Larry Shanks, Project Officer
National Coastal Ecosystems Team
National Space Technology Laboratories
NSTL Station, Mississippi 39529

Performed for
National Coastal Ecosystems Team
Office of Biological Services
Fish and Wildlife Service
U.S. DEPARTMENT OF THE INTERIOR

Environmental Planning for Offshore Oil and Gas

Volume I: Recovery Technology

Volume II: Effects on Coastal Communities

Volume III: Effects on Living Resources and Habitats

Volume IV: Regulatory Framework for Protecting Living Resources

Volume V: Regional Status Reports (Separate Reports):

Part 1: New England

Part 2: Mid and South Atlantic

Part 3: Gulf Coast

Part 4: California

Part 5: Alaska, Washington and Oregon

This report should be cited thusly:

Corwin, R., and P. H. Heffernan. 1978. Environmental Planning for Offshore Oil and Gas. The Conservation Foundation, Washington, D. C. U.S. Fish Wildlife Service, Biological Services Program. FWS/OBS-77/16.4. 154 pp.

ENVIRONMENTAL PLANNING FOR OFFSHORE OIL AND GAS

FOREWORD

This report is one in a series prepared by The Conservation Foundation for the Office of Biological Services of the U.S. Fish and Wildlife Service (Contract 14-16-0008-962). The series conveys technical information and develops an impact assessment system relating to the recovery of oil and gas resources beyond the three-mile territorial limit of the Outer Continental Shelf (OCS). The series is designed to aid Fish and Wildlife Service personnel in the conduct of environmental reviews and decisions concerning OCS oil and gas development. In addition, the reports are intended to be as helpful as possible to the public, the oil and gas industry, and to all government agencies involved with resource management and environmental protection.

Oil and gas have been recovered for several decades from the Outer Continental Shelf of Texas, Louisiana and California. In the future, the Department of the Interior plans to lease more tracts, not only off these coasts, but also off the frontier regions of the North, Mid- and South Atlantic, eastern Gulf of Mexico, Pacific Northwest and Alaska. Within the set of constraints imposed by the international petroleum market (including supply, demand and price), critical decisions are made jointly by industry and government on whether it is advisable or not to move ahead with leasing and development of each of the offshore frontier areas. Once the decision to develop a field is made, many other decisions are necessary, such as where to locate offshore platforms, where to locate the onshore support areas, and how to transport hydrocarbons to market.

Existing facilities and the size of the resource will dictate which facilities will be needed, what the siting requirements will be, and where facilities will be sited. If the potential for marketable resources is moderate, offshore activities may be staged from areas already having harbor facilities and support industries; therefore, they may have little impact on the coast adjacent to a frontier area. An understanding of these options from industry's perspective will enable Fish and Wildlife Service personnel to anticipate development activities in various OCS areas and to communicate successfully with industry to assure that fish and wildlife resources will be protected.

The major purpose of this report is to describe the technological characteristics and planning strategy of oil and gas development on the Outer Continental Shelf, and to assess the effects of OCS oil and gas operations on living resources and their habitats. This approach should help bridge the gap between a simple reactive mode and effective advanced planning--planning that will result in a better understanding of the wide range of OCS activities that directly and indirectly generate impacts on the environment, and the countermeasures necessary to protect and enhance living resources.

Development of offshore oil and gas resources is a complex industrial process that requires extensive advance planning and coordination of all phases from exploration to processing and shipment. Each of hundreds of system components linking development and production activities has the potential for adverse environmental effects on coastal water resources. Among the advance judgements that OCS planning requires are the probable environmental impacts of various courses of action.

The relevant review functions that the Fish and Wildlife Service is concerned with are: (1) planning for baseline studies and the leasing of oil and gas tracts offshore and (2) reviewing of permit applications and evaluation of environmental impact statements (EIS) that relate to facility development, whether offshore (OCS), near shore (within territorial limits), or onshore (above the mean high tidemark). Because the Service is involved with such a broad array of activities, there is a great deal of private and public interest in its review functions. Therefore, it is most valuable in advance to have some of the principles, criteria and standards that provide the basis for review and decisionmaking. The public, the offshore petroleum industry, and the appropriate Federal, state, and local government agencies are thus able to help solve problems associated with protection of public fish and wildlife resources. With advanced standards, all interests should be able to gauge the environmental impacts of each OCS activity.

A number of working assumptions were used to guide various aspects of the analysis and the preparation of the report series. The assumptions relating to supply, recovery, and impacts of offshore oil and gas were:

1. The Federal Government's initiative in accelerated leasing of OCS tracts will continue, though the pace may change.

2. OCS oil and gas extractions will continue under private enterprise with Federal support and with Federal regulation.

3. No major technological breakthroughs will occur in the near future which could be expected to significantly change the environmental impact potential of OCS development.

4. In established onshore refinery and transportation areas, the significant impacts on fish and wildlife and their habitats will come from the release of hydrocarbons during tanker transfers.

5. A significant potential for both direct and indirect impacts of OCS development on fish and wildlife in frontier areas is expected from site alterations resulting from development of onshore facilities.

6. The potential for onshore impacts on fish and wildlife generally will increase, at least initially, somewhat in proportion to the level of onshore OCS development activity.

The assumptions related to assessment of impacts were:

1. There is sufficient knowledge of the effects of OCS development activities to anticipate direct and indirect impacts on fish and wildlife from known oil and gas recovery systems.

2. This knowledge can be used to formulate advance criteria for conservation of fish and wildlife in relation to specific OCS development activities.

3. Criteria for the protection of environments affected by OCS-related facilities may be broadly applied to equivalent non-OCS-related facilities in the coastal zone.

The products of this project--reported in the series Environmental Planning for Offshore Oil and Gas--consist of five technical report volumes. The five volumes of the technical report series are briefly described below:

Volume I — Reviews the status of oil and gas resources of the Outer Continental Shelf and programs for their development; describes the recovery process step-by-step in relation to existing environmental regulations and conservation requirements; and provides a detailed analysis for each of fifteen OCS activity and facility development projects ranging from exploration to petroleum processing.

Volume II Discusses growth of coastal communities and effects on living resources induced by OCS and related onshore oil and gas development; reports methods for forecasting characteristics of community development; describes employment characteristics for specific activities and onshore facilities; and reviews environmental impacts of probable types of development.

Volume III Describes the potential effects of OCS development on living resources and habitats; presents an integrated system for assessment of a broad range of impacts related to location, design, construction, and operation of OCS-related facilities; provides a comprehensive review of sources of ecological disturbance for OCS related primary and secondary development.

Volume IV Analyzes the regulatory framework related to OCS impacts; enumerates the various laws governing development offshore; and describes the regulatory framework controlling inshore and onshore buildup in support of OCS development.

Volume V In five parts, reports current and anticipated OCS development in each of five coastal regions of the United States: New England; Mid and South Atlantic: Gulf Coast; California; and Alaska, Washington and Oregon.

John Clark was The Conservation Foundation's project director for the OCS project. He was assisted by Dr. Jeffrey Zinn, Charles Terrell and John Banta. We are grateful to the U.S. Fish and Wildlife Service for its financial support, guidance and assistance in every stage of the project.

William K. Reilly
President
The Conservation Foundation

PREFACE

This report is one of five regional reviews, the fifth volume in a series of background reports on the impacts of Outer Continental Shelf (OCS) oil and gas recovery sponsored by the U.S. Fish and Wildlife Service, Office of Biological Services, and prepared by The Conservation Foundation (under Contract 14-16-0008-962). The five reviews are: New England, Mid and South Atlantic, Gulf Coast, California and Alaska, Washington and Oregon. Other volumes in the series and the overall purposes of the OCS project are described in the Foreword.

The regional reports focus on past and potential impacts on living resources and on their habitats in each region. They also highlight prominent coastal resource-related issues associated with proposed OCS lease sales.

The regional reports present brief overviews of the status of offshore oil and gas activities and impacts for the selected regions. They are meant to inform U.S. Fish and Wildlife Service employees and other interested persons outside the subject region who wish to be generally knowledgeable about the status of OCS around the country and both past and anticipated effects on living resources of the region.

The reports were prepared by analysts who are recognized for their expertise in OCS impacts or coastal zone management. The contents and organization of the reports are as consistent as possible given regional differences in subject matter and differences in the authors' approaches. Each study has five sections:

1. The initial section of each regional report is a discussion of past and present OCS production. This provides a historical perspective that establishes a setting for the remaining sections. Statistics on lease sales, production and reserves are important topics in this section.

2. The second section describes OCS development and future potential, including industry activities, the present leasing schedule and anticipated future projects. This section varies depending upon the amount of anticipatory investigation completed by public agencies and industry.

3. The third section discusses the effects on living resources of activities that accompany OCS petroleum development. A majority of these concerns occur near shore or onshore, where resource values and high impact potential are concentrated. The relative importance of particular habitats

and living resources vary by region. For example, shellfish may be of paramount concern in one region, birds in a second region, and coastal marshes and wetlands in a third region.

4. The fourth section concerns socio economic impacts. These issues are generally treated in less detail, because living resources is the primary subject of the project and the socio economic impact information is only to provide a working background. Since socio economic impacts have been the subject of many other studies, and interest in most areas has centered on socio economic rather than living resource impacts, there is extensive information elsewhere on this subject. Two major topic areas are included in each report: effects of anticipated development and regional interest in OCS.

5. The fifth section is regional information analysis. Publications of regional import are annotated. Each study lists about a dozen publications which contain the best regional research into OCS and related issues.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

We are very appreciative to a number of people who assisted with these reports. We would particularly like to thank the following for their help and guidance: Dr. Howard Tait and Larry Shanks of the National Coastal Ecosystems Team, Office of Biological Services, U.S. Fish and Wildlife Service, provided guidance and review. Reviewers who commented on draft products include: Dr. Bill Van Horn of the Bureau of Land Management; Mr. Bud Damaburgher of the U.S. Geological Survey and Mr. Al Powers, U.S. Department of the Interior, OCS Coordinator.

Additional assistance was provided by U.S. Fish and Wildlife Service personnel familiar with the area covered by this report: Drs. Jay Watson and John Byrne (Portland, Oregon) Office of Biological Services.

Dr. J. Clarence Davies, Executive Vice President, The Conservation Foundation, provided institutional review and editorial guidance. Portions of the draft reports were reviewed by staff members Raymond Tretheway and Claudia Wilson. This report was edited by Lawrence C. Leopold, Sea Grant Program, University of Southern California.

1. INTRODUCTION

The people of California have become especially sensitive to environmental problems resulting from the leasing and development of oil and gas on Federal lands of the Outer Continental Shelf (OCS) of Southern California. This response stems partly from the fact that portions of the Santa Barbara Channel were leased in 1968 despite strong objections from environmentalists. After the Santa Barbara Channel field started producing, a well from Union Oil's Platform A blew out and spilled oil that coated beaches as far away as San Diego. The state responded to public opinion in 1974 when Governor Brown initiated an interagency study on environmental and economic impacts of the proposed OCS Lease Sale Number 35 (Sale 35). The consultants and staff assembled for the assessment of Sale 35 formed the nucleus of the OCS Project Task Force.

The authors of this Regional status report also participated in the Governor's OCS Task Force Study in August-September 1976. This report is based principally on materals assembled by the OCS Task Force, is a review of current and potential effects of OCS oil and gas development on living resources. It also serves as an introduction to many related environmental issues on the California Outer Continental Shelf.

This document should maintain its utility and relevance to its intended audience. However, there have been delays and changes in the scheduling sequences of future sales.

These delays are based partly upon the kinds of problems and issues described in this regional summary. The most recent approved leasing schedule is presented in Table 1. For California, the sale of lease number 35 was made in December 1975; sale dates for Sale 48 (Southern California) is rescheduled for June 1979 and Sale 53 (Central and Northern California) is rescheduled for February 1981.

This report, although using the California OCS Task Force material as a base, clearly serves an independent purpose to a national audience.

Table 1. Proposed OCS Planning Schedule (Source: Bureau of Land Management, Department of the Interior. August, 1977. Office of the Secretary. Washington, D.C.)

SALE AREA	1977					1978											1979											1980											1981										
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
CI Cook Inlet		N	S																																														
42 N Atlantic	F		P		N	S																																											
43 South Atlantic Georgia Embayment			F		P		N	S																																									
45 Gulf of Mexico				F		P		N	S																																							
65 Eastern Gulf of Mexico						E		H			F	P		N	S																																		
51 Gulf of Mexico							E		H			F		P		N	S																																
49 Mid-Atlantic		T						E		H			F			P		N	S																														
48 Southern California														E		H			F		P		N	S																								
58 Gulf of Mexico			C		D		T								E		H			F		P		N	S																							
54 South Atlantic Blake Plateau		C				D			T									E		H			F		P		N	S																			
Federal/State Beaufort (near shore)			C		D				T											E		H			F			N	S																		
55 Gulf of Aloeka										C		D			T										E		H			F		P		N	S												
62 Gulf of Mexico														C		D			T								E		H			F		P		N	S										
46 Kodiak																													E		H			F		P		N	S								
52 North Atlantic																C		D			T							E		H			F		P		N	S								
53 Central and Northern California				C							D			T																	E		H			F		P		N	S						
60 Cook Inlet																C		D			T								E			H			F		P		N	S						
56 South Atlantic Georgia Embayment																			C		D			T									E		H			F		P		N	S				
59 Mid-Atlantic																							C		D			T							E		H			F		P		N	S		
66 Gulf of Mexico																									C		D			T							E		H			F		P		N	S	
57 Bering Norton																				C					D			T								E		H				F		P		N	S

C - Call for Nominations
D Nominations Due
T - Announcement of Tracts
E - Draft Environmental Statement
H - Public Hearing
F - Final Environmental Statement
P - Proposed Notice of Sale
N - Notice of Sale
S - Sale

THE DEPARTMENT OF THE INTERIOR

II. PAST AND PRESENT OCS PRODUCTION

GENERAL

Offshore oil and gas production in California first began in 1896. The wells were drilled from wooden piers along the beach at Summerland, Santa Barbara County. In 1896-1975, more than 1.5 billion barrels of oil and 1 billion Mcf (Mcf = 1,000 cubic feet) of natural gas have been produced from California tidelands and the Outer Continental Shelf. Proven reserves for production are estimated to be approximately 524,000,000 barrels of oil and 187,000,000 Mcf of natural gas.[1] Gas production from current fields peaked in 1968 and oil production peaked in 1969. Both are expected to decline in the near future despite secondary recovery techniques.[2]

A total of 248 exploratory wells and 3,127 development wells have been drilled for oil and gas. As many as 200 production wells may operate from a single artificial island. Production from shore-based slant-drilled wells is usually charged to offshore production. Production is almost completely limited to the most southern counties.[3] At present, the State Lands Commission has leased a total of 136,294 acres of tidelands for oil and gas development, and the Department of the Interior has leased 1,082,848 acres of Federal OCS lands.[4]

In 1975 the Southern California area supported the following offshore oil and gas operations and related facilities (all State licensed unless otherwise indicated):

Item	Number	
Offshore		
Marine terminals	11	
Production platforms	14	(7 State, 7 Federal)
Oceanfloor wells	5	
Artificial islands	6	
Onshore		
Major harbors	18	(plus 12 island caves)
Refineries	12	
Shipyard and fixed platform construction yards	5	
Oil and gas separation and cleaning facilities	35	

The level of oil and gas activity and construction of facilities should eventually rise sharply as a result of sales 35 (1975) and 48 (1979). In fact, the State of California estimates that from 20 to 60 platforms ultimately could be erected in Southern California coastal waters.

BREAKDOWN BY COUNTY

A county-by-county listing of onshore and offshore oil development and production refineries, transportation methods,

support facilities, piers, methods of processing, and environmental problems are given in this section. Maps of all counties are in Appendix 1. (See also Figures 1, 2, and 3) Appendix II lists the individual facilities in each county.

Information for the figures and county maps was obtained from the Office of Planning and Research in the California Governor's Office, from city and county records, from the file of the State Division of Oil and Gas, from the Bureau of Land Management, and from interviews with oil company personnel. Adequate pipeline information was not available when this report was written. The Task Force is currently compiling the necessary information and will release pipeline maps with its final report.[5]

Santa Barbara County

1. Development and Production. There are 37 oil tracts in production in state tidelands, and 68 in Federal OCS waters off the Santa Barbara Coast. Most are being developed or explored at the present time and over 30 oil and gas fields are now producing 235,000 barrels of oil per day (BOPD).[6] In all, there are 13 offshore platforms and 42 subsea wells. Although gas injection and waterflooding are being used to insure the rate of recovery from some fields, production is still declining. One field has been exhausted and the platforms removed (see Appendix 1, Maps 1 through 7).

Figure 1. Offshore tract locations for Southern California OCS Sale No. 35 (Source: Office of Planning and Research, State of California. March 4, 1976. Sacramento, California).

Figure 2. OCS/onshore planning project: offshore leasing area (Source: Office of Planning and Research, State of California, March 4, 1976. Sacramento, California).

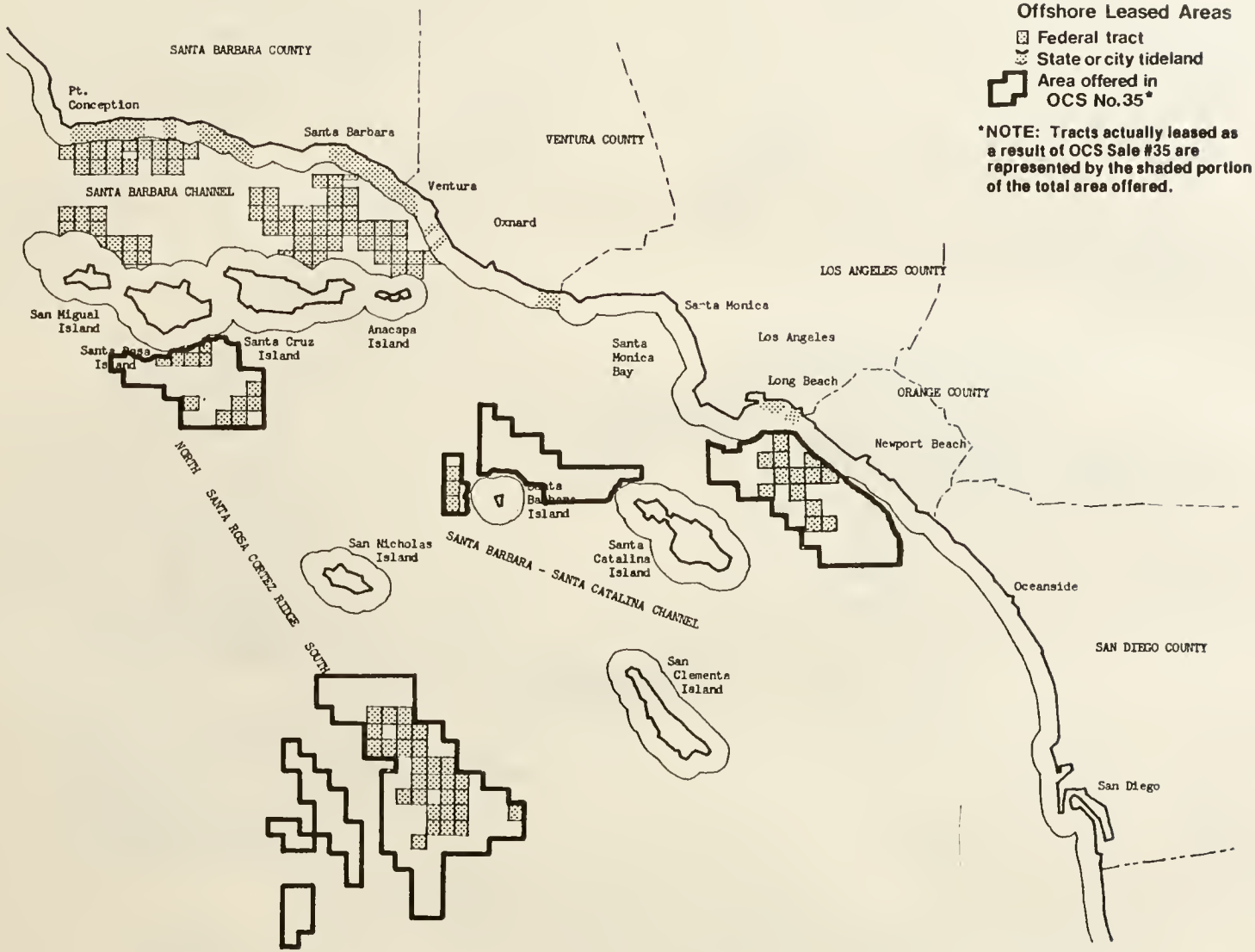


Figure 3. Oil and gas development in the Santa Barbara Channel, Outer Continental Shelf (Source: United States Geological Survey, Department of the Interior. March 1976. "Oil and Gas Development in the Santa Barbara Channel Outer Continental Shelf Off California." FES 76-13).

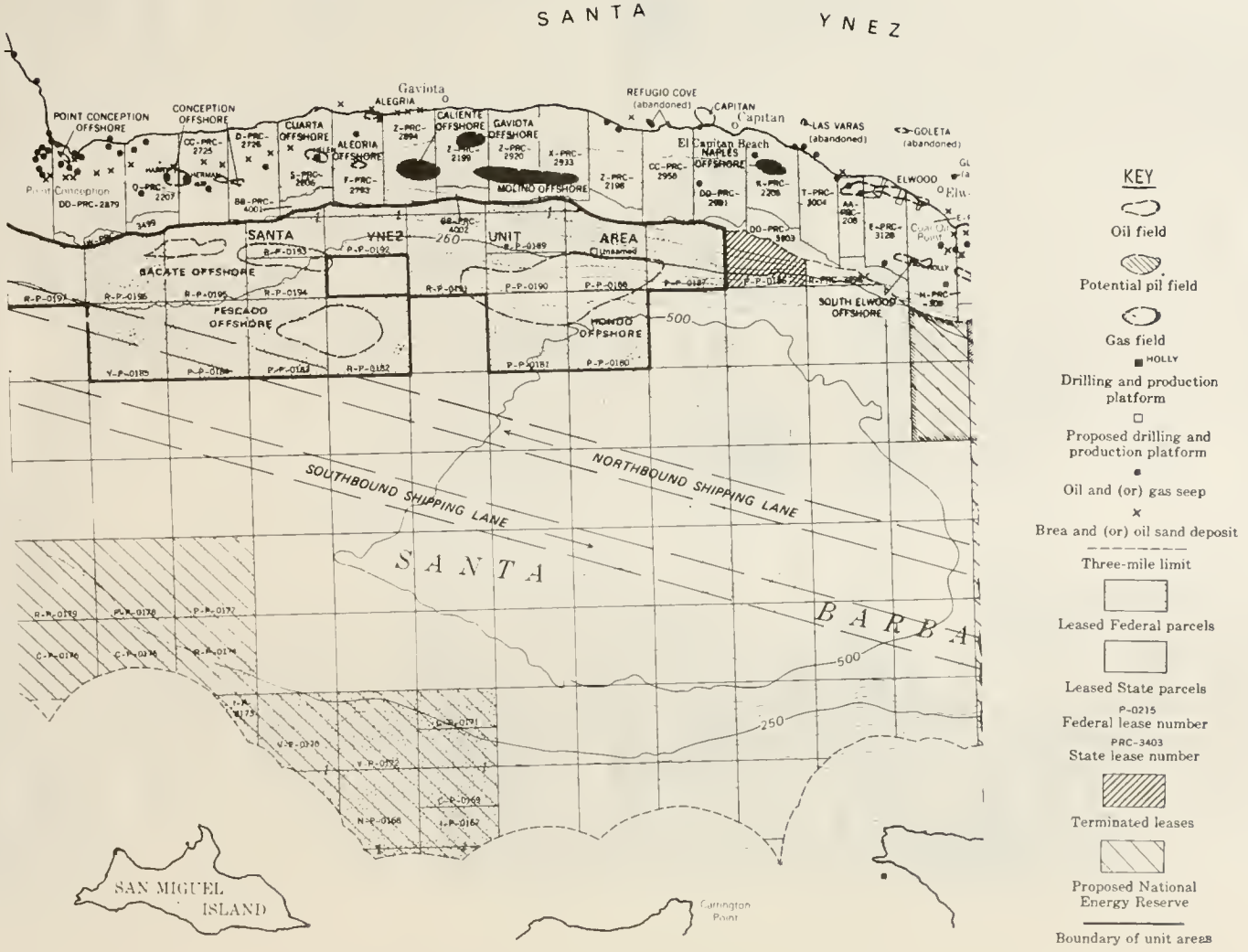
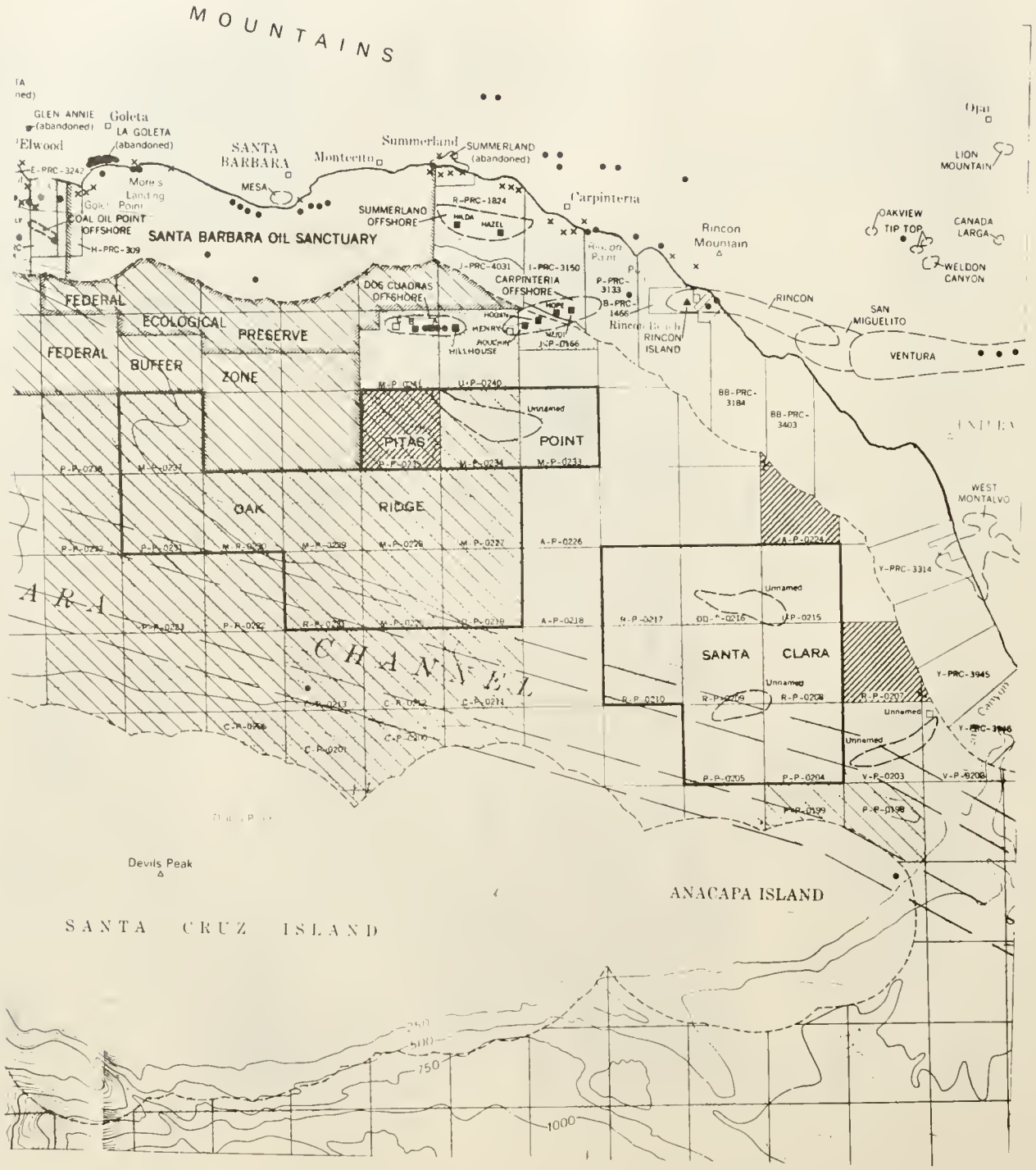


Figure 3. continued.



2. Onshore Support Facilities. Two piers serve as offshore platforms in Santa Barbara County. The Signal Pier (owned by AMINOIL, formerly Burmah Oil) has been condemned by the State Lands Commission and must be removed unless the County purchases it for a recreational pier. The Casitas Pier in Carpinteria is operated by SOCAL. A third pier, at Gaviota, is not available for commercial use. The agreement sought by AMINOIL with the County, concerning a takeover of the Signal Pier, includes a stipulation allowing for its use by oil crews, but not for materials or equipment.

3. Processing. Ten processing facilities and two abandoned ones presently exist on Santa Barbara's coast. Five marine terminals are in operation. ARCO is seeking permission to expand its South Ellwood plant to process larger quanities of oil and to process sour gas. Although Exxon has a permit for construction of an oil and gas processing facility in Las Flores Canyon, it is contesting limitations imposed by the California Coastal Commission on the construction of an associated marine terminal. AMINOIL has temporarily withdrawn its application to abandon its Coal Oil Point storage and shipping facilities. SOCAL has received all but the final permits to expand production from its platforms in State lands offshore from Carpinteria and may require an expansion of its Carpinteria facility, althought no application has been filed.

4. Environmental Problems. Oil continues to pollute nearby beaches from seeps around Platform A, from platform and tanker spills, and from natural seeps in the Channel. Air pollution is generated by oil and gas processing, platform operation, and tanker loading. An upwelling of oil and gas in 1973, subsequent to ARCO's initiation of gas injection from

nearby Platform Holly, indicated a connection between injections and seep activity, but so far no conclusive evidence has been obtained.[7] Some coastal and upland areas may be developed to accommodate the needed processing facilities. The proposed AMINOIL marine terminal will endanger the rich Naples reef habitats.

5. Special Features. The only estimate of the total natural seepage in the Santa Barbara Channel was 200 to 250 BOPD.[8] There is presently insufficient baseline data to determine the relationship of additional drilling on rates of seepage, and its biological impacts.

Projected estimates of tanker traffic in the Santa Barbara Channel in the 1980's range up to 8,500 trips per year.[9] Near collisions between tankers and drill ships have been observed and tanker captains sometimes ignore mapped sea lands.[10] Shipment of Alaskan oil, for Indonesian Liquid Natural Gas (LNG), and for offshore processing facilities, if approved, will likely increase the rate and danger of oil spills due to accidents.

The San Miguel and Santa Rosa, Santa Cruz and Channel Islands are under the jurisdiction of Santa Barbara County. These islands provide nesting and roosting sites for numerous bird species, and breeding grounds for marine mammals. There is speculation that these islands will be staging areas for the development of other OCS tracts.

Ventura County

1. Development and Production. Ventura County has a long history of onshore oil and gas production. Offshore production occurs only from piers on state lands and on an artificial island on the north coast of

the county. The two offshore fields, Rincon and West Montalvo, produced 485,260 barrels of oil in 1975, averaging 1,320 BOPD for the year. Production is maintained by sucker rods operating on the piers and on Rincon Island (See Appendix I, Maps 7 through 9 and 12).

2. Onshore Support Facilities. Seven major and dozens of smaller offshore oil support industries operate in the county. Port Hueneme is a major staging area for offshore support. This port's governing body is actively seeking additional oil business and has land available for expansion.[11] The port may also become a marine terminal for the transshipment of oil from the Navy's Elk Hills reservoir.

3. Processing. Eleven processing facilities and three marine terminals are located on the Ventura coast and in the Ventura River corridor. Five of the facilities usually process only offshore oil. Some oil from platforms off the coast of Santa Barbara is brought to Ventura for separation and treatment and is shipped by tanker and pipeline.

4. Environmental Problems. Current environmental problems are caused by hydrocarbon releases from tankers, either loading or underway, and from occasional small oil spills from drilling piers. Disturbance of wildfowl habitat is caused by operations of the Union Oil Company marine terminal at McGrath Lake.

5. Special Features. San Nicholas and Anacapa Islands have not been identified as possible target areas for oil development, but would be affected by spills. The islands serve as pinniped rookeries and the habitat of several unusual and possibly unique invertebrates and fishes.[12]

Los Angeles County

1. Development and Production. Los Angeles County is the leading oil and gas producer of the coastal counties. The first wells were drilled in the Wilmington field tidelands granted to the City of Long Beach in 1939.[13] A large scale water injection program is now underway in the declining Long Beach fields. Wells are drilled from piers and from four artificial islands in San Pedro Bay. Drilling derricks on the islands are disguised as apartments and lighthouses. Other offshore oil development is from slant-drilled onshore rigs in the Torrance and Venice offshore fields (See Appendix I, Maps 15 through 19).

2. Onshore Support Facilities.[14] The Port of Los Angeles is a major center for oil and gas support operations. Three major shipyards build and repair vessels, repair platforms, and provide fabrication services. The harbor area itself includes over 7,000 acres and supports 13 water-front facilities equipped to ship or receive oil and gas products. There are 23 berths and 13,000 linear feet of berthing space which are used for the oil operations of 15 private companies and by the U.S. Navy. The supertanker oil terminal can accommodate a fully loaded 117,000 Dead Weight Tonnage (DWT) vessel with a draft of up to 51 feet. Future plans are to increase this capacity to 165,000 DWT (this may be delayed if Alaska oil is not offloaded at Los Angeles).

Storage capacity for oil and oil products in the port is 11 million barrels and more storage facilities are currently under construction. Estimated total capacity will equal 28 to 32 million barrels in the next two or three years. The L.A. Harbor District has announced plans to deepen its channels and turning basins to handle larger tankers and to

increase the availability of uncovered storage and of industrial lands in the vicinity of the port.

The second major oil operation and support center is at the Port of Long Beach, located in the eastern half of San Pedro Bay. The port is managed by the Long Beach Harbor Commission which has jurisdiction over 7,200 acres. About 17.7 million tons of bulk oil was transported in 1973-74. Seven berths with 3,782 linear feet of dock will accommodate vessels of broad beam configuration, up to 151, 272 DWT and 51 foot drafts. Plans are being implemented for additional turning basins, tanker bunkering systems, utility services, and oil transmission facilities.

El Segundo maintains a fixed buoy mooring marine terminal and submarine pipeline that will accommodate tankers of 130,000 DWT for discharge to onshore refineries.

Redondo Beach/King Harbor is used primarily for sport fishing, but SOCAL maintains a number of 40-foot long, ocean-going tugs at the harbor to service the mooring system at El Segundo. Basin Number 3 at King Harbor can handle vessels up to 65 feet in length and 7-1/2 foot draft. Other support services exist in the City of Gardena (rig assembly) and Signal Hill.

3. Processing. Thirteen oil and gas processing facilities exist in the Los Angeles area. Ten serve offshore facilities. Over 56% of the total California refinery capacity is within a 20-mile radius of the Port of Los Angeles.

4. Environmental Problems. Of the vast wetlands along the Los Angeles coast, only 270 acres (4%) remain. Dredging and filling have

been the primary sources of habitat destruction in the region. If dredging and filling operations are significantly expanded, much of what is left will be destroyed. Air pollution will increase if significant hydrocarbon vapor emissions from additional tanker loading operations occur in the ports. Smog from the Los Angeles basin is currently causing damage to trees up to 65 miles away in the San Bernardino and Los Padres National Forests.

5. Special Features. Santa Catalina and San Clemente Islands are part of Los Angeles County. Both provide breeding sites for seabirds and mammals. The OCS Task Force identified Santa Catalina as a possible crew staging area if the island's owners, the Wrigley Family, consent to this use. At present, the family controls the use of the Island in agreement with the County Parks Department.

According to the Parks and Recreational Department, Los Angeles' beaches are the most heavily used coastal recreation areas in Southern California (76,770,974 visitors in 1971). These areas have been used so heavily that one of every three families seeking use of the beach were turned away for several weeks in the summer of 1976.

Orange County

1. Development and Production. Offshore oil and gas is currently produced from fixed platforms and artificial islands on state lands in Orange County (See Appendix I, Maps 19 and 20 and 22). Oil from two state tideland fields is currently being produced from onshore wells slant-drilled into offshore formations.

2. Onshore Support Facilities. Platforms Emmy and Eva are served by helicopter from Huntington Beach. The City's pier is reserved for recreation and is not used by support boats. Oil workers are staged at the 1,800-foot long Seal Beach Pier, which can accommodate boats up to 80 feet in length. Conversion of the Seal Beach Pier for more intensive staging of materials would require a significant increase in onshore development.

3. Processing. Seven oil and gas processing facilities are located in Orange County, two of which serve offshore fields exclusively. Oil storage tanks are located in Huntington Beach, Brea and Atwood in the Santa Ana River area, and at Newport.

4. Environmental Problems. Dredging and filling of wetlands has drastically altered the Orange County coastline. Air pollution from the Mobil refinery and small oil spills from the Gulf marine terminal also contribute to oil-related degradation of the environment.

5. Special Features. Orange County beaches are a valuable recreation resource for the region, and receive heavy use by local and non-coastal residents.

San Diego County

San Diego has no history of onshore or offshore oil development and no oil-related facilities currently exist within the County (See Appendix I, Maps 25 and 28 through 30). However, two large shipyards and two support industries are located in San Diego and fuel oil is received and stored for a power generation plant at Encino. There is high potential for a deepwater port, crew staging, and possibly

processing facilities to serve oil production activities in the Santa Rosa-Cortez and Tanner Banks areas leased in Sale 35. Non-hazard to navigation (exploration) permits have been granted by the Corps of Engineers for 19 tracts in these two areas. San Diego Harbor is the third largest harbor south of Point Conception and could be developed for platform fabrication and related activities, although all oil development has been halted pending completion of a new Master Plan. Helicopter staging is also possible from the San Diego airport.

Footnotes

1. All California oil and gas field production statistics and estimates of proven reserves were furnished by the Division of Oil and Gas in the Resources Agency of the State of California. Production statistics for the Dos Cuadras and Carpinteria offshore fields were furnished by the USGS. All statistical documents are on file with the OCS Task Force, Office of Planning and Research, Sacramento, California.

2. Governor's Office of Planning and Research. August 1976. Oil and Gas Development: Southern California. OCS Task Force, Office of Planning and Research. Sacramento, California, (draft). p. 2-2.

3. American Association of Petroleum Geologist. September, 1976. Background Paper #5--Update. AAPG Information Package--through 1975. Strategic Committee on Public Affairs, American Association of Petroleum Geologists. Tulsa, Oklahoma. (contains 1976 data).

4. Ibid.; and update information by telephone to State Lands Commission, September 26, 1976.

5. Approximately December 15, 1976.

6. OCS Task Force, op. cit. p. 3-10 and 3-11.

7. California Department of Fish and Game. June 28, 1973. The 1973 Coal Oil Point Upwelling. California Department of Fish and Game, Sacramento, California.

8. U.S. Department of Interior, U.S. Geological Survey. March 4, 1976. Final Environmental Statement, Oil and Gas Development in the Santa Barbara Channel. U.S. Geological Survey, Washington, D.C. II-621, II-126.

9. Interview with Dr. Arent Schuyler, Chairman, Environmental Studies Program, UCSB. This estimate is in the same range as one prepared (but not yet released) by SAI, Inc. in preparation of EIR for an LNG facility in Oxnard, Ventura County. Contact Al Reynolds, Office of Environmental Quality, County of Santa Barbara for update estimates of ship traffic.

10. Schuyler, cited.

11. OCS Task Force, op. cit., section VI, various pages.

12. Fay, R. C. 1972. Southern California's Deteriorating Marine Environment. Southern California Association of Governments. p. 35.

13. California State Lands Commission. 1971. Offshore Petroleum Resource. California State Lands Commission. Sacramento, California. p. 67-69.

14. Information on the County of Los Angeles was drawn from Section V Onshore Impact of Offshore Southern California OCS Sale #35 (Office of Planning and Research, Governor's Office, January 1976). Telephone verifications and updates were made by the author during the research for this report.

15. Ibid., section IV.

III. OCS DEVELOPMENT AND FUTURE POTENTIAL

POTENTIAL

The BLM Draft Final Environmental Statement on Sale 35 originally indicated potential oil resources in the candidate tracts to be between 1.6 and 2.7 billion barrels of oil. Elimination of Santa Monica Bay tracts as candidates reduced this estimate to 1.3 to 2.3 billion barrels.[1] The Western Gas and Oil Association at one time estimated that the entire area covered by Sale 35 contained 6 to 19 billion barrels of undiscovered oil. However, this figure included tracts that were not subject to leasing at that time, although they could be offered by order of the Secretary at a later date[2] (See Table 2).

The OCS Task Force has recalculated the estimates of reserves and potential production from the Santa Barbara Channel and the tracts leased in Sale 35 (See Tables 3-5). The American Association of Petroleum Geologists estimated the proven reserves for the entire California coastal region to be 637,615,000 barrels of oil, and 743,166 MMcfdof natural gas.[3]

Ten OCS oil fields and one gas field are known to exist off Southern California. One additional field, Carpinteria, crosses the State-Federal boundary. The Dos Cuadras and Carpinteria offshore fields are now in production and Exxon is constructing a production platform on the Hondo offshore field in the Santa Ynez Unit. All known OCS fields are in the Santa Barbara Channel. Estimates of undiscovered reserves are to be considered "best guesses" based on geological and geophysical exploration, and will undoubtedly change as exploratory drilling continues.[4]

Table 2. Potential OCS Lease Areas and Reserves in California (Source: Bureau of Land Management, Department of the Interior - does not include areas nominated for Lease Sale #48)

Area	Million BBL Oil	Billion Ft^3 Gas	Acreage (Estimated)
San Pedro Bay	709-946	602-821	280,000
Santa Monica Bay	329-440	479-711	163,700
Santa-Rosa Cortes (North)	242-431	603-1108	291,500
Santa-Rosa Cortes (South)	239-660	613-1785	639,400
Santa Barbara-Santa Catalina	67-219	103-342	180,400
Totals	1,586-2,696	2,400-4,767	1,555,000

Table 3. Estimates of Southern California OCS Undiscovered Petroleum Resources (Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Development: Southern California - Preliminary Draft, Sacramento, California)

REPORT		USGS CIRC 725	USDOI ES OCS	USDOI ES OCS	USDOI ES LS 35	USGS OCS REV	USGS OCS REV	WOGA	CALIF DOG	CALIF DOG	RAND	BOOZ ET AL
EXHIBIT NUMBER		3-1	3-3	3-3	3-4	3-6	3-6	3-9	3-11	3-13	3-14	3-15
DATE PUBLISHED		1975	1975	1975	1975	9-75	9-75	10-74	1-73	8-75	9-75	7-75
AREA USED IN ESTIMATE		(1)	(3)	(4)	(5)	(3)	(4)	(9)	(11)	(11)	(14)	(16)
BASIS FOR RESOURCE ESTIMATE		(2)	(2)	(2)	(2)	(2)	(2)	(10)	(12)	(12)	-	(2)
RANGE OF ESTIMATED UNDISCOVERED RESOURCES BILLIONS OF BARRELS	LO	2	-	-	1.6	-	-	6	-	-	6±(15)	0.5
	M	3	1.1	1.2	-	1.2	1.3	13.8	18.7	18.7	10±(15)	-
	Hi	5	2.1	2.9	2.7(6)	-	-	19	-	-	13±(15)	1.3
RANGE OF ESTIMATED OIL PRODUCTION RATES THOUSAND OF BARRELS/DAY (P INDICATES PEAK)	LO	-	-	-	110	-	-	-	-	-	800±P	150
	M	-	125	135	-	-	-	1015P	(13)	(13)	1140P	-
	Hi	-	165	220	185(7)	-	-	-	-	-	1610P	300
RATIO OF GAS ESTIMATE/OIL ESTIMATE 1,000 CU. FT./BBL.		1.0+	1.0	1.0	1.5-1.8	(8)	(8)	2.0	(8)	(8)	0.6-1.5	-

(1) OFFSHORE PACIFIC COASTAL STATES TO 200 METER (660 FEET) WATER DEPTH
(2) USGS RESOURCE APPRAISAL GROUP
(3) SOUTHERN CALIFORNIA FEDERAL OCS TO 200 METER WATER DEPTH
(4) SOUTHERN CALIFORNIA FEDERAL OCS BETWEEN 200 AND 2500 METER WATER DEPTH
(5) SOUTHERN CALIFORNIA FEDERAL OCS AREA PROPOSED FOR LEASING SALE NO. 35
(6) WOGA ESTIMATE OF 14 BILLION BARRELS WAS USED AS THE HIGH RANGE FOR COMPUTING OIL SPILL ESTIMATES AND ANALYSIS.
(7) USING USGS METHOD OF DIVIDING OIL RESOURCE ESTIMATE BY 40 YEAR LIFE GIVES RATE OF 960,000 B/D FOR THE 14 BILLION BARREL WOGA ESTIMATE
(8) GAS CONVERTED TO OIL EQUIVALENT
(9) POTENTIAL PETROLEUM AREAS BY PARKER WITHIN CALL FOR NOMINATION AREA OF OCS LEASE SALE 35
(10) PARKER MODIFIED 1971 AAPG MEMOIR 15
(11) SOUTHERN CALIFORNIA OCS
(12) MODIFIED AAPG MEMOIR 15
(13) BOTH REPORTS INCLUDE A CURVE SHOWING ESTIMATED FUTURE PRODUCTION TO 1985. THE PRODUCTION RATE STARTS TO INCREASE THE YEAR AFTER THE DATE OF REPORT AND INCREASES RAPIDLY. THE 1975 ARTICLE SHOWS AN INCREASE OF 500,000 B/D BY 1985 FOR OFFSHORE CALIFORNIA UNDER OPTIMUM CONDITIONS
(14) CALIFORNIA OCS
(15) FROM PROJECTED PRODUCTION RATES TABLE 2, PAGE 7 OF REPORT
(16) LEASE SALE 35 AREAS SANTA ROSA-CORTES NORTH AND SOUTH AND SANTA BARBARA-SANTA CATALINA

Table 4. Estimated OCS Oil and Gas Reserves and Potential Production in California (Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Gas Development: Southern California - Preliminary Draft, Sacramento, California)

USGS LEASE SALE #35 RESOURCE ESTIMATES		
Area	Million BBL Oil	Million Mcf Gas
San Pedro Bay	709 - 946	602 - 821
Santa Rosa Cortes (North)	242 - 431	603 - 1,108
Santa Rosa Cortes (South)	239 - 660	613 - 1,785
Santa Barbara - Santa Catalina	67 - 219	103 - 342

Table 5. Offshore Petroleum Reserves OCS Production Estimates (Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Gas Development: Southern California - Preliminary Draft, Sacramento, California)

Area	Year					
	1975	1980	1985	1990	1995	2000
Lease Sale #35 (Thousands b/d)	0	20	120	200	200	200
Santa Barbara Channel	40	100	150	150	150	150
Sum of 1 and 2	40	120	270	350	350	350
Rand Low Supply	0	137	640	810	750	620

EXPLORATION

The Offshore Oil and Gas Operations Office of USGS reports that three applications for exploratory drilling have been approved for the Southern California offshore area. Two are in the San Pedro Bay and one is in the Santa Barbara Channel. Shell Oil Company reported an oil strike in the San Pedro Bay tract OCS-P 2096. Shell plans to drill a series of five to seven wildcat wells to depths of 7,500 feet in 650 feet of water. Other wells are planned for leased tracts Nos. 247, 256 and 261. Shell may move to the Tanner Banks area after completing exploration in the San Pedro Bay, and drill in OCS-P 0977 (leased tract 114) about 85 miles offshore from Long Beach.[5] SOCAL is also drilling in the San Pedro Bay, using the Cuss I to drill OCS-P 0296 (leased tract 254) to depths of 10,000 feet in 600 feet of water.[6]

USGS also reports that 13 other applications for drilling in the new lease tracts are now pending, and Sun Oil has submitted an application to drill exploratory well Number 9 in a tract the firm leased earlier in the Santa Barbara Channel. Texaco is now drilling exploratory well Number 3 from a drillship anchored over OCS-P 0234, in the Pitas Point field.[7]

LEASING

The Bureau of Land Management plans to hold Sale 48 in June, 1979, for Southern California, and has already accepted lease tract nominations and negative nominations from Federal, state, local government agencies, private parties, and the oil industry.[8] Nominations were

taken on approximately 2,400 offshore tracts covering 13.2 million acres from Point Conception to the Mexican border. The tracts extend as far offshore as 190 miles. Most of the tracts being considered by the Department have been offered for lease before, but 490 new tracts covering 2.7 million acres between the southern boundary of Sale 35 and the territorial waters of Mexico were not previously available. The fourteen nearshore tracts composing the Santa Barbara Ecological Reserve have been withdrawn by the Department of the Interior from nomination. But, 90 tracts in the Channel may be available. Some tracts off Huntington Beach also have been withdrawn because of possible jurisdictional disputes. Nominations closed on September 7, 1976.[9]

The State OCS Task Force responded to the Call for Nominations by identifying tracts that the state feels should be withdrawn (negative nominations) and listing justifications for withdrawal. The following types of tracts were withdrawn: tracts intersected by vessel traffic lanes; tracts located within a three-mile buffer zone adjoining the state tidelands; tracts located in ecologically valuable bank areas; tracts recommended for deletion from the San Pedro Bay for environmental and aesthetic reasons, and those previously withdrawn by the Secretary of Interior. Also, for Sale 48, Santa Barbara County submitted negative nominations for nearly all of the Santa Barbara Channel for reasons of public safety and aesthetics.

A number of the lease areas off the Southern California coast have been designated as Areas of Special Biological Significance (ASBS) by the California Water Resources Control Board. Based on these designations and the Oil and Gas Sanctuaries established by

the Legislature (see map, Appendix III). William Press, Director, Office of Planning and Research, requested a 3-mile buffer zone adjacent to the requested state boundary along the coast and around all Southern California Islands. This zone would provide protection for sea bird rookeries on Santa Barbara and San Miguel Islands and other biologically rich areas, and would also protect the state tidelands from excessive drainage caused by oil and gas activities.[10]

The State of California has also asked for a moratorium on leasing in San Pedro Bay. Justification for this request included geological hazards, poor water quality, aesthetics, air pollution impacts on populated areas, damage to valuable sport and commercial fisheries, and port congestion.[11] Tracts in San Pedro Bay have consistently drawn the highest bids from the industry because of the virtual certainty of oil deposits. Royalties offered to the Federal Government from the Bay tracts are 33-1/3%, not the usual 16-2/3%, because of the high chance of finding oil. Thus, there is great pressure from oil interests to lease and develop these tracts.[12]

PLANNING FOR OCS PRODUCTION

BLM estimated in the Final Environmental Statement that as many as 60 new platforms will be located off Southern California as a result of Sale 35. In addition, Exxon is now completing construction of a platform in its Hondo field in the Santa Ynez Unit, and estimates that as many as three more platforms may be required to completely develop the entire unit. The addition of two previously approved platforms, Union's Platform C and Sun Oil's Platform Hillhouse, which

was delayed for legal reasons, will be placed in the Channel soon. Both will be located in the Dos Cuadras field. ARCO is currently considering a second platform in the area of Coal Oil Point to continue development of the South Ellwood offshore field. Although ARCO has not applied for a permit, the platform is shown on maps submitted to the State Lands Commission with an application to drill more wells from the existing Platform Holly. Only the County of Santa Barbara is planning for this development and related onshore facilities.

A state-wide coastal planning effort is being produced by the newly re-established California Coastal Commission.[13] The California Coastal Plan, adopted by the Commission in December of 1975, consists of provisions for implementation by State and local agencies, and plan maps and summaries. Several sections of the "Findings and Policies" chapter deal specifically with offshore oil development and related onshore facilities.[14]

The Commission recommended the following offshore environmental needs: (1) multiple use of nearshore platforms and artificial islands for recreation as well as oil production,(2) a trade off between reduction of costs and the increase in environmental risks caused by submerged production systems,(3) correction of the inadequacy of spill cleanup and containment methods, and (4) consolidation of land-based OCS-related facilities to minimize environmental impacts.

Separate sections of the law include refineries and LNG plants and tanker terminals. Section 30263 of the 1976 California Coastal Act states: "(1) New or expended refineries or petrochemical facilities otherwise consistent with the provisions of this diversion shall be permitted if (a)

alternative locations are not feasible or are more environmentally damaging; (b) adverse environmental effects are mitigated to the maximum extent feasible; (c) it is found that not permitting such development would adversely affect the public welfare; (d) the facility is not located in a highly scenic or seismically hazardous area on any of the Channel Islands, or within or contiguous to environmentally sensitive areas; and (e) the facility is sited so as to provide a sufficient buffer area to minimize adverse impacts on surrounding property. (2) In addition to meeting all applicable air quality standards, new or expanded refineries or petrochemical facilities shall be permitted in areas designated as air quality maintenance areas by the State Air Resources Board and in areas where coastal resources would be adversely affected only if the negative impacts of the project upon air quality are offset by reductions in gaseous emissions in the area by the users of the fuels. In the case of an expansion of an existing site, permission is granted of the total size emission levels for each emission type for which national or state ambient air quality standards have been established do not increase. (3) New or expanded refineries or petrochemical facilities shall minimize the need for once-through cooling by using air cooling to the maximum extent feasible and by using treated waste waters from inplant processes where feasible. Policies regarding refinery construction along the coastal zone attempt to minimize environmental impacts through siting and design criteria, and use of new refinery capacity to increase the state's supply of low-sulfur fuel".

The Coastal Law lists several proposals for new deepwater terminals along the coastal zone including Estero Bay (up to 400,000 DWT vessels

by SOCAL*), Moss Landing, Morro Bay, and the Long Beach and Los Angeles Harbors. Policy recommendations for siting tanker terminals include the development of full use of existing facilities (several are currently under-utilized[16]) and preparing criteria for locating and operating new terminals to reduce environmental impacts. Section 30261(a) of the 1976 California Coastal Law states: "Multicompany use of existing and new tanker facilities shall be encouraged to the maximum extent feasible and legally permissible, except where to do so would result in increased tanker operations and associated onshore development incompatible with the land use and environmental goals for the area. New tanker terminals outside of existing terminal areas shall be situated to avoid risk to environmentally sensitive areas and shall use a monobuoy system, unless an alternative type of system can be shown to be environmentally preferable for a specific site. Tanker facilities shall be designed to (1) minimize the total volume of oil spilled, (2) minimize the risk of collision from movement of other vessels, (3) have ready access to the most effective feasible containment and recovery equipment for oil spills, and (4) have onshore deballasting facilities to receive any fouled ballast water from tankers where operationally or legally required."

The number of LNG facilities is to be limited in the coastal zone, according to the California Coastal Plan, until engineering and operational solutions to safety problems associated with LNG can be devised. The major problems that must be solved in LNG development include fire and accidents resulting from LNG spills and the need for deep draft

*Although an Environmental Impact Report was filed- the proposals apparently were withdrawn.[15]

port facilities to accommodate the LNG tankships. The new legislation re-establishing the California Coastal Commission limits the number of LNG facilities on the coast to one until the Commission finds that the associated safety problems have been solved.

Procedures for coastal plan implementation are contained in legislation signed by the Governor on September 29, 1976, re-establishing the Commission. A master plan for ports and harbors, and a joint State Coastal Commission-local government permit system is described in the new legislation.[17] Regional plans for siting OCS-related facilities will be developed when scenarios of possible production from OCS lands are completed by the OCS Task Force at a later date.

It is important to note that the legislation signed by the Governor does not explicitly mention the California Coastal Plan as the designated plan for the coastline. Coastal Commission staff emphasize that the adopted Coastal Plan is advisory only and will be used by the State Coastal Commission as a guideline in their evaluation of local government planning for the coast. Under the legislation, the State Commission may reject local plans that, in the findings of the Commission, do not match the plans of the State Commission's staff. The operation of the procedures listed in the legislation are still unclear however and will undergo a political and legal shakedown process in the coming months. The scenarios and regional and subregional plans developed by the OCS Task Force in cooperation with staffs from the State Commission and local governments also have no legal validity and must be adopted by the policy bodies of the cities and counties along the coast and then

found to be in compliance with overall coastal planning accomplished by the State Coastal Commission staff.

POTENTIAL NEW ONSHORE FACILITIES

Planning for potential new onshore facilities on a county-by-county basis is not possible without reliable information on potential OCS oil and gas field locations and production. Precise estimates of field production, or even of field location, are not possible until exploratory wells have defined oil-bearing structures. Even so, geological and geophysical data and interpretations can be used for more refined estimates than the state has been able to make to date. These data have been withheld as a matter of policy supported by the Freedom of Information Act by the Department of the Interior on the grounds that it is proprietary. Litigation by State and local agencies has not been successful in obtaining it.

The OCS Task Force completed an initial planning study of potential production from Sale 35 and the Santa Barbara Channel. This effort, published in January, 1976, developed assumptions of field location and production from data provided by the USGS and other sources to identify "target areas" in each county that could be expected to be developed for processing, treatment, storage or shipment of OCS oil and gas. Criteria for target area selection were developed in cooperation with oil company representatives and are as close as possible to those used by the industry in selecting sites for OCS-related development. The selection of target areas represents the only comprehensive attempt to plan for OCS production in California to date, although a number of related studies,

described in Section VI, are in progress. A county-by-county description of the target areas follows.

San Diego County

Although no tracts were leased off San Diego's shores, two areas sold in Sale 35 are potentially significant to the county, and large areas have been nominated for leasing in Sale 48 off the coast of San Diego. In Sale 35, 29 tracts were sold in the Santa Rosa-Cortez and Tanner Banks areas. Twenty-one exploratory drilling permit applications have been submitted to the U.S. Corps of Engineers and 19 of those have been granted. The land base, if any, for the development of these tracts cannot be predicted at this time and may depend to some degree on tracts leased in the upcoming Sale 48. Some staging and support services could conveniently be located in San Diego's harbor, which is large enough to accommodate crew boats and supply vessels. Initially, a helicopter staging base is most likely. A potential deepwater port site exists in the northern part of the county at Encino, adjacent to the existing Encino Marine Terminal used to offload fuel oil for a power generating plant.

Orange County

1. Huntington Beach. The OCS Task Force identified Huntington Beach as a target area for OCS-related development because of the existing oil storage maintained by Southern California Edison, Gulf, Standard, and AMINOIL Oil Companies, and the processing facilities operated by AMINOIL and SOCAL. The processing facilities presently have an excess capacity of approximately 40,000 BOPD. Oil companies hold 1,750 acres of land in

Huntington Beach, most of which is used for oil and gas facilities, but with space left for expansion. Gulf operates an offshore marine terminal and AMINOIL operates a helicopter center in Huntington Beach. The City Council has passed a resolution opposing offshore production that would be visible from the shore, but has not expressly forbidden further oil operations in the city.[18]

2. The Santa Ana River Corridor. A private environmental impact report has been prepared by Esca-Tech Corporation of Long Beach, evaluating four alternative pipeline corridors from the coast to inland refineries for OCS oil.[19] The Santa Ana river corridor was regarded as the most feasible site. The other alternatives were not released. The study and further research by the OCS Task Force shows that the river represents an excellent route for pipelines to existing storage facilities at Atwood and Brea and to refineries further inland. However, the river mouth has been identified by the California Department of Fish and Game as a possible wildlife area for acquisition by the State. Such acquisition would probably block the use of the river for pipelines.[20]

Los Angeles County

1. Port of Los Angeles. The OCS Task Force nominated the Port of Los Angeles as a prime target for onshore development for OCS-related facilities. Port authorities are planning to expand oil and gas operations and oil companies are also planning for expansion in the port. Port plans include increases in capacity of the existing supertanker oil terminal (noted above in II) and expansion of the present 11 million barrels of oil storage to as much as 33 million barrels. Port planners

have also expressed interest in using land in Reeves Field, recently released from leasehold by the Navy, for dry bulk storage, interim storage tanks, oil and LNG terminal facilities.

2. Port of Long Beach and Surrounding Areas. The Port of Long Beach, located on the eastern half of the San Pedro Bay, has been identified by SOHIO, Inc. as the western terminal for its oil shipments from Valdez, Alaska. However, the California Air Resources Board has indicated that the offloading of tankers in the port would contribute a hydrocarbon load to the Los Angeles air basin that would cause serious violation of Federal air quality standards. The Chairman of the CARB has written the Director of the Federal Energy Administration, stating that unless effective vapor recovery devices are developed and installed on all tankers in the Alaska trade, a permit cannot be granted SOHIO for the Long Beach terminal.[21]

The Port of Long Beach General Plan of 1975 contains descriptions of oil tank modules, possible expansions of tanker facilities, present and future land transportation systems, utility services, ship bunkering and oil transmission systems.[22] There is also industrially-zoned land around the port that could accommodate OCS-related development. A significant area of industrially-zoned land also exists in the southeast part of the City of Long Beach, adjacent to Orange County. This land is currently occupied by two large power generating plants and by oil drilling operations.

3. El Segundo. El Segundo would be identified as an oil and gas land base only if Santa Monica Bay were to be leased. The withdrawal of the Bay from Sale 35 indicates that no development will take place

in the El Segundo area unless Santa Monica Bay tracts are leased in some subsequent sale. El Segundo was considered because it is the site of SOCAL's El Segundo Refinery, the closest such facility to Santa Monica Bay tracts. A fixed-buoy, mooring marine terminal and submarine pipelines have serviced tankers up to 138,000 DWT at the 200,000 b/d complex. The refinery has received permission for a 125,000 b/d desulfurization addition and there is land available to SOCAL for expansion of the refinery. Company officials say they would seek this option if OCS oil is available in the area.[23]

4. Santa Catalina Island. This island has been identified by the OCS Task Force as a possible crew-staging area and storage center for cleanup equipment. These uses for the island were also mentioned by Western Oil and Gas Association's report on Sale 35.[24] Two harbors on the island, Catalina Harbor and Isthmus Cove, can accommodate boats up to 30 feet long in all weather conditions. Both have been used in the past for staging of crews involved in platform testing.

Ventura County

1. Rincon Area. Four locations in the Rincon area support OCS oil and gas operations and have been identified as target areas for OCS-related onshore development. These locations are: Mobil Rincon (also known as Sea Cliff), a processing and storage site operated by Mobile Oil Company; La Conchita, a tank farm and marine terminal operated by the Phillips Oil Company; Punta Gorda, onshore and offshore production and processing site maintained by various operators;

and Pitas Point, a Mobil Oil Company pipeline landfall for oil coming from platforms in State tidelands to tanks and processing equipment in adjacent Padre Juan Canyon.

All four sites have development potential, especially the large processing plant at Mobil Rincon, which has excess capacity and available land for expansion. The Phillips Oil processing plant at La Conchita is also operating below capacity, and the site has good potential for a marine terminal, but there is little land for expansion. Punta Gorda has available land in oil company ownership for expansion of both heater-treaters and tanks, although some additional equipment would have to be located in an adjoining canyon.

2. Ventura Avenue Area. The area running east and west along the Ventura River is shown on the local General Plan as identified for oil refining and storage.[25] A number of processing and storage facilities exist in the area and a small refinery in the river basin is now being completed. An abandoned Seaside Corporation refinery and the VETCO offshore service and pipeyard are also in the area. Air pollution regulations may constrain future oil and gas related development.[26]

3. McGrath Beach-Ventura Marina. Union Oil maintains 285,000 barrels of crude oil storage for shipment from its Ventura Marina terminal at McGrath Beach. Union holds vacant land in the area and additional land zoned for heavy industry exists in the dunes. Oil is produced onshore in the area and shipped out through Union's terminal. Development of the Santa Clara unit would make this an attractive site for processing and storage.

4. Mandalay Beach. Southern California Edison maintains 785,000 barrels of oil storage for its generating plant at Mandalay Beach. The tanks are supplied by an offshore pipeline and terminal. There is land available for expansion and the surrounding land presently supports onshore oil production and processing. The State Coastal Commissions recommendation that the beach dunes be preserved could be a major restraint on the use or development of the beach area for processing oil and gas from the Santa Clara unit or other tracts in the eastern Santa Barbara Channel.

5. Ormond Beach. Ormond Beach is currently being considered as a site for a proposed LNG vaporization plant. There is now an electric generating plant with over 2-1/2 million barrels of oil storage, and a small industrial complex in the area. The area is surrounded by farms. A refinery site could be assembled at Ormond Beach even with the development of an LNG complex. The establishment of processing and storage of oil and gas from the Hueneme Canyon Fields would not present site problems unless conflicts with local air and land use regulations exist.

6. Port Hueneme. Port Hueneme will undoubtedly serve as the major staging and supply area for any offshore oil development in the Santa Barbara Channel. As indicated above, there is also a plan under consideration to bring oil from the Navy's Elk Hills reservoir to the port for shipment to northern and southern refineries. This plan would require the construction of storage facilities,and possibly processing facilities, at the port. Port officials are aggressive in promoting the port for oil and gas uses and would encourage use of port lands for any OCS-related development.

Santa Barbara County

Several proposals for new or expanded OCS-related developments have been pending in Santa Barbara County for two years. The County is attempting to implement a consolidation policy (See below, "Special Features") requiring that all new oil and gas facilities be combined to minimize impacts. Additionally, an LNG vaporization facility is proposed for Point Conception, at the west end of the Santa Barbara Channel. The recent Coastal Zone Conservation Act stipulates that only one such facility may be constructed on the coast. This leaves uncertain the fate of the proposals for Santa Barbara, Ventura County and Port of Los Angeles.[27] Planning for production is quite advanced. This results mainly from efforts of the Director of the County Office of Environmental Quality to force the consideration of all available options in the environmental impact reports. Also, the County Board of Supervisors established a policy requiring consolidation of facilities in existing sites or limitation to as few sites as possible.[28] Target areas identified by the OCS Task Force include the coastline from Point Conception to Ellwood, the Ellwood area from Naples to Coal Oil Point, Carpinteria around the existing Standard Oil processing plant, and possibly the Santa Barbara Channel Islands. The latter could serve as processing and storage areas for oil produced from tracts in the deepwater areas.

Specific sites now under consideration by County planners are (1) Los Flores Canyon, approved for use by Exxon for an oil and gas processing plant, (2) Ellwood, site of existing ARCO oil processing plant and subject of an application for expansion, and (3) Naples, an area on the bluffs that AMINOIL wants for a tank farm that is to be connected to a proposed marine

terminal near Naples Reef. Enforcement of the consolidation policy will make development of all three impossible. Leasing in the Channel from OCS Sales 48 may change the picture for Santa Barbara because numerous Channel tracts have been nominated.[29]

PROCESSING AND DISTRIBUTION

The 13 offshore platforms and 42 subsea wells in the Santa Barbara Channel area are serviced by 15 treatment and storage facilities and five marine terminals. The Final Environmental Impact Statement released by BLM on development of the Channel gave an estimated potential of 10 to 21 new platforms or submerged production systems, one to five additional processing and storage facilities, and one to five additional marine terminals.

The consolidation policies of the State Coastal Commission and of the county may significantly reduce subsequent requirements. The county and State Coastal Commission are currently attempting to negotiate a consolidation of the three proposed facilities described above, and to eliminate the marine terminals by requiring construction of a pipeline overland to Los Angeles refineries. The consolidation effort has been stalled by litigation and inherent weaknesses in the county's present procedure for considering permit applications. Final outcome of the consolidation attempt with regard to the present applications may be known by December, 1976.

There are six artificial offshore islands, two platforms and several onshore wells slant-drilled into offshore formations in the Los Angeles and Long Beach Harbors area and in Huntington Beach in Orange County.

These production facilities are served by nine petroleum terminals, one offshore marine terminal, and 11 operating processing and storage units. The BLM Final Environmental Impact Statement did not give an estimate of additional processing and distribution needs for production from Sale 35 tracts. However, the OCS Task Force did develop high and low production assumptions for Sale 35 and estimated additional facilities that would be required under each case. They are as follows:

Orange County (Production from San Pedro Bay tracts)[30]

High Case 45,000-65,000 BOPD	Need for New Facilities One additional processing and storage facility plus some gas handling capacity.
Low Case 25,000-35,000 BOPD	No new processing and storage needed.

Los Angeles County (Production from San Pedro, Santa Rosa-Cortex South and Santa Barbara Island tracts)[31]

High Case 141,000-250,000 BOPD plus natural gas	Need for New Facilities One to three new processing capacity of 11,000-188,000 mcfd also needed.
Low Case 70,500-130,000 BOPD plus natural gas	One to two new processing and storage facilities of 80,000 b/d capacity and the low estimate of needed gas handling capacity in the high case, above.

The OCS Task Force also developed estimates for oil and gas production likely to be processed and stored in Ventura County, and projections of additional facilities that may be needed. Estimated production is based on experience from the development of existing leases including the Pitas Point and Santa Clara Units. This experience is extended to

San Miguel and Oak Ridge leases, Santa Rosa-Cortez North tracts, and Santa Rosa-Cortez South tracts, plus remaining unleased tracts in the Channel. Scenarios of production based on phasing of fields for both 20 and 40-year field lives were developed by the Task Force. Scenario II, calculated from USGS production estimates assumes a 20-year field life (most probable in the opinion of industry representatives) and assumes that production will vary from 110,000 BOPD in the period 1980 to 2000 A.D. to 20,500 BOPD from 2005 to 2025 A.D.[31] This recognizes the probable scheduling of development of various fields. Using these production assumptions and present surplus refining capacity data, the Task Force projected construction of a Union Oil processing and storage facility at Mandalay Beach and additional storage at other locations. No other processing, storage, or marine terminals are projected because of the existing surplus capacity in the county.[32]

There are several documents which attempt to review the relationship between the anticipated Alaskan North Slope (ANS) petroleum production and the refinery/demand capacities in California and PADD V. A survey of specifically relevant documents indicates a rather high degree of uncertainty in establishing a fixed value for the expected surplus crude oil (See Table 6 for examples of estimated ranges). Combined OCS and ANS production is expected to exceed PADD V market demands, hence refinery capacities. At least two sources contain extensive discussions of the complex factors that will operate, to a presently unknown extent, to determine the market surplus for California refinery capacity. The documents are North American Crude Oil Supply and Transportation: A California View[33] and U.S. Department of the Interior

Table 6. Estimates of West Coast Crude Oil Surpluses (Source: California Energy Resources Conservation and Development Commission Biennial Report: Part II - The Elk Hills Naval Petroleum Reserve and California Energy Planning DRAFT by Robert L. Solomon, November 10, 1976, page 47)

	1978	1980	1982	1985
Sohio	300-600		750-900	
El Paso	400			
Exxon		697		1796
Rand (med. use/med. production case)		320		751
A. D. Little		689		1395
Arco		600		850
FEA	400-800			

All estimates = thousand barrels/day

DEIS Crude Oil Transportation System: Valdez, Alaska to Midland, Texas.[34] It appears that unless NAS production is sold entirely to the international market, Alaskan crude will exceed California refinery requirements (assuming no long-term importation disruptions). Hence, there seems to be little doubt that a surplus will exist; however, the magnitude of the surplus cannot be estimated at present.

TECHNOLOGY ADVANCEMENT NEEDS AND POTENTIALS

Special problems have been identified by The OCS Task Force identified special problems relating to future development of offshore oil and gas in Southern California, including navigation dangers, implementation of consolidation policy and air pollution from tanker loading. The following technological advancements are needed to resolve all three.

1. Traffic Control. Estimates of traffic in the Santa Barbara Channel will run as high as 8,500 trips a year if transportation of North Slope oil through the Channel and the development of an LNG facility at Point Conception becomes a reality. Tanker traffic in the Channel, enlarged by additional oil and gas development and aggravated by the presence of new platforms and drillships, will present high potential for collisions and spills. Although, sea lanes are charted, the tanker captains often deviate from them. The OCS Task Force and local planners have recommended the development of a traffic monitoring system in the Channel. The system will guide vessels by ship-to-shore communications, as well as by using regional, land-based enforcement service boats and

planes similar to those used by the U.S. Coast Guard for airborne oil spill detection patrols.

The Santa Barbara County Office of Environmental Quality points out that radar and radio equipment exists at Vandenberg Air Force Base in northern Santa Barbara County to provide the necessary traffic monitoring and communications for such a system in the Channel. Additional equipment would have to be installed in the Los Angeles area to provide similar traffic control for harbors there.

2. Pilot Training. The OCS Task Force and the Santa Barbara County Office of Environmental Quality are considering the use of training equipment to familiarize captains and tanker pilots with conditions in an increasingly crowed Channel. The system under consideration is CAORF, operated by the Maritime Administration of the Department of Commerce, which uses computerized vessel traffic simulation to give pilots the "feel" of a ship in a certain location. The facility would have to be programmed for the Santa Barbara Channel.

3. Modular Processing and Storage Facilities. Consolidation of facilities that will service oil and gas fields being developed at different periods requires special design of processing facilities. The facilities must be able to store, transport, or refine a wide range of volume production and to accommodate oils of different weight and chemical characteristics. Operators may wish to develop special processing practices designed for specific circumstances. The co-mingling of oil, or expansion and contractions of processing facilities, may be different or impossible due to the unique design of each facility. New designs of heater-treaters, Stretfield Units, burners and other

equipment in modules that are self-contained and quickly installed would allow local governments to specify sites for consolidated processing and storage plants. The site would remain the same over the 20 to 50 years that oil fields in the area would be developed but the equipment may be changed as needed.

4. Tanker Vapor Recovery Systems. A major source of reactive hydrocarbons is the venting of vapors from tankers during the loading process, and to some degree during unloading and tank washdown. Present attempts to recover the vapors from loading tankers have failed to reduce the danger of explosion of the collected vapors, and operators are not willing to risk lives and equipment on untested systems. Development of safe and effective vapor recovery equipment will reduce serious air pollution problems and eliminate one argument of local and state agencies in favor of pipelines as an alternative of tankers. However, the problem of the greater spill hazard from tankers will remain unsolved.

5. Oil Spill Containment and Cleanup Equipment. Oil diverting booms or other devices that can effectively contain or remove oil from seas with waves 6 to 8 feet high have not yet been developed nor are they certain to be. For better performance and technological advancement for surface oil film control, the OCS Task Force has recommended that oil spill cleanup operations be transferred to a state agency and that funding for research and development of more effective equipment and techniques be provided by the Federal government.

SPECIAL FEATURES

Special features of the Southern California OCS oil and gas development include the subject of air pollution and tanker traffic (described

previously), coordinated environmental protection activities, and environmental sanctuaries.

Coordinated environmental protection activities require close communication between the State Coastal Commission, local and state agencies, and local governments. Procedures for the preplanning necessary to anticipate oil industries needs, and to channel disparate applications into a consolidated environmental program are being studied by the OCS Task Force, the staff of the Coastal Commission, and affected local governments. A related problem results from the demand for pipelines to move processed oil to refineries in the Los Angeles and San Francisco areas. Pipelines have been shown to be several times less prone to spills than marine terminals and tankers; however, there is a strong tendency to use existing tankers, rather than pipelines, because of an overstocked tanker market. Pipelines also require a large front end investment that can only be amortized if the size of the field insures oil supplies for as much as 20 years. Many oil and gas companies also prefer to use their own transportation facilities because they do not wish to give control over the delivery of their products to a pipeline firm.

State of California environmental sanctuaries should be considered a valuable oil and gas deterrent in Southern California (sanctuaries also have been nominated in OCS water of Central and Northern California). Sanctuaries were designated by the State Legislature to prohibit oil and gas development that may directly or indirectly endanger the critical nature of the coastline. State law provides that the sanctuaries may be opened for oil and gas development in the event the State finds that

wells on adjacent lands are draining oil or gas from under the sanctuaries.[35] A map of the State sanctuaries is provided in Appendix III. Although the State has requested a 3-mile buffer zone around the sanctuaries, tract nominations for Sale 48 show no such buffer zone. BLM has not yet designated those tracts that will be available and may agree to the State's request for such a buffer. A buffer zone was provided by the BLM around the Santa Barbara Sanctuary in the initial channel leases.

Footnotes

1. U.S. Department of Interior, Bureau of Land Management. August, 1975. Draft Environmental Statement Proposed 1975 OCS Oil and Gas General Lease Sale Offshore Southern California, OCS #35. Bureau of Land Management, Washington, D.C. DES 75-8.I-1.

2. Western Gas and Oil Association. October, 1974. Environmental Assessment, OCS Lease Sale #35. Western Oil and Gas Association. Los Angeles, California.

3. American Association of Petroleum Geologist. September 1976. Background Paper #5--Update. AAPG Information Package--Through 1975, American Association of Petroleum Geologists, Strategic Committee on Public Affairs. Tulsa, Oklahoma. p. 8.

4. Governor's Office of Planning and Research. August, 1976. Offshore Oil and Gas Development: Southern California. (draft) OCS Task Force, Office of Planning and Research, Sacramento, California. Section I.

5. No author. September 1976. Drilling Begins in San Pedro Bay. Offshore, Vol. 36, No. 10. p. 161-162.

6. Telephone interview Cal Weide, Offshore Oil and Gas Operations Office, USGS, Los Angeles, California. September 27, 1976; and Offshore, op. cit.

7. Ibid.

8. U.S. Department of Interior, Bureau of Land Management. July 16, 1976. Press Release, Bureau of Land Management, Washington, D.C.

9. No author. August 2, 1976. Big Area Eyed for of California Sale. Oil and Gas Journal. Vol. 74, No. 31. p. 55-56.

10. William Northrup, Director, State Lands Division, memo to J. Anthony Kline, Office of the Governor, July 1, 1976, re: nominations and comments on OCS lands.

11. Information on the California response to the call for nominations for Lease Sale #48 are drawn from a letter to George Turcott, Associate Director, BLM, Washington from William Press, Director OPR, September 14, 1976. A copy of the letter is available from the OCS Task Force.

12. Rintoul, B. June 20, 1976. Alaska and California on Threshold of Exploratory Expansion. Offshore. Vol. 36, No. 7. p. 91-102.

13. Senate Bill 1277; see especially "Digest", and section 30233.

14. California Coastal Zone Conservation Commission. December 1975. California Coastal Plan. California Coastal Zone Conservation Commission. Part II, policies 71-98.

15. Standard Oil of California. November 1974. Environmental Impact Report, Estero Bay Deepwater Terminal and Estero Bay to Richmond Pipeline Project. Submitted to the Office of the Environmental Coordinator, San Luis Obispo County, California.

16. Coastal Plan. p. 135.

17. Senate Bill 1277, section 30330-30522.

18. OCS Task Force, OPR, January, 1976, IV-9.

19. The study was privately done for an unnamed client and is not available to the public or government agencies. Esca-Tech Corp. furnished this information in interviews with OPR staff.

20. There are also city proposals to build a marina at the river mouth.

21. Letter from Tom Quinn, Chairman, California Air Resources Board, to Frank Zarb, Director, Federal Energy Administration, July 7, 1976.

22. Port of Long Beach. 1975. General Plan. Port of Long Beach, Long Beach, California.

23. Office of Planning and Research. January, 1976. p. V-18.

24. Dames and Moore, Inc. October 1974. Environmental Assessment Study, Proposed Sale of Federal Oil and Gas Leases, Southern California OCS. For Western Oil and Gas Association. Los Angeles, California. Vol. I. p. II-B-48.

25. General Plan of Ventura County is composed of a series of studies and maps, rather than a single plan. The reference here is to the General Plan maps available from the Ventura County Environmental Resources Agency.

26. Conversations with Jan Bush, Deputy Director of Ventura County Air Pollution Control District. The APCD is currently drafting a "New Source Review" regulation which will seriously constrain construction of future sources of pollution such as tank farms and marine terminals.

27. Senate Bill 1277, adding Division 20 to the Public Resources Code. Signed by Governor Brown September 29, 1976.

28. Resolution #67-22, 1967.

29. Confidential map furnished by BLM; available in December with BLM permission.

30. Governor's Office of Planning and Research. January 1976. Onshore Impact of Offshore Southern California OCS Sale #35. Office of Planning and Research, OCS Task Force. Sacramento, California.

31. Ibid. V 29-31.

32. Ibid. VI-5 and VI-23.

33. California Energy Resources Conservation and Development Commission. November 1976. Biennial Report: Fossil Fuel Issues Report, Part II: The Elk Hills Naval Petroleum Reserve and California Energy Planning, DRAFT, California Energy Resources Conservation and Development Commission. p. 47.

34. U.S. Department of Interior, No. date. Draft Environmental Impact Statement. Crude Oil Transportation Systems: Valdez, Alaska to Midland, Texas (SOHIO EIS). Chapter 2, Vol. III. Department of the Interior, Washington, D.C. p. 2-953 through 2-1028.

35. Public Resources Code, Division 6.

IV. EFFECTS ON LIVING RESOURCES

SPILLS AND LEAKS

1. Past Sources. Platform A in the Dos Cuadras field off the coast of Santa Barbara blew out in 1969, spilling several thousand barrels of oil a day for 10 days into the Santa Barbara Channel.[1] In 1971 the Oregon Standard and the Arizona Standard collided in fog at the entrance to San Francisco Bay, spilling an estimated 20,000 barrels of oil. In that same year the U.S. Coast Guard estimated that there were 1,643 spills from other sources in California waters, primarily pipeline breaks and line leaks that released 13,309 barrels of oil.[2] Other spills occurred during the loading and unloading of tankers, from ruptured shoreline storage tanks, and from intentional discharge of tankers.

2. Potential.[3] The Bureau of Land Management estimated that 0.23 to 2.6 million barrels of oil would be released into the environment during the operational life of Sale 35 leases. Tankers and barges were expected to account for spills of 0.11 to 1.6 million barrels. Pipeline accidents were expected to release between one-fifth and one-twelfth as much oil as tankers. Other estimated spills are 88,000 to 487,000 barrels of oil from well blowouts and small leaks and spills from loading and unloading tankers. BLM also reported that the various spills would range from a few barrels to over 150,000 barrels. The OCS Task Force compared these estimates with other projected spills from Sale 35 (Tables 7 and 8). Estimates of potential spillage from development of the Santa Barbara Channel and Sale 48 are not available.[4]

Table 7. Worst Case Assumptions for Potential Oil Spills (Source: Governor's Office of Planning, State of California. January, 1976, Onshore Impact of Offshore Southern California OCS Sale No. 35 - Draft Report)

Production Field	Expected Total Amount Spilled by Tanker, Field Life (barrels)		Expected Total Amount Spilled by Pipeline, Field Life (barrels)	
	Worst Case Assumption		Worst Case Assumption	
	100% Capacity Outflow	65% Capacity Outflow	10-mile Drain	5-mile Drain
Santa Rosa-Cortes (N)				
Low Estimate of Reserves	21,200	12,200	3,200	2,600
High Estimate of Reserves	48,300	40,300	6,800	5,400
Average*	34,750	26,250	5,000	4,000
Santa Barbara-Santa Catalina				
Low Estimate of Reserves	3,100	2,850	600	300
High Estimate of Reserves	13,200	9,200	2,600	2,200
Average*	8,150	6,025	1,600	1,250
Santa Rosa-Cortes (S)				
Low Estimate of Reserves	20.200	15,200	3,200	2,500
High Estimate of Reserves	89,400	84,400	13,400	10,400
Average*	54,800	49,800	8,300	6,450

*Average of the expected total amount spilled results based on the low and the high estimates of reserves.

Table 8. Summary of Potential Spill Estimates (Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California, August, 1976, Offshore Oil and Gas Development: Southern California - Preliminary Draft, Sacramento, California)

	Distance To Shore (miles)	Estimated Reserves (10^6 barrels)		Per Barrel Cost (cents)		Expected Total Value of Oil Spilled Field Life (barrels)	
		Low	High	Low	High	Low	High
Santa Rosa-Cortes (N)							
Tanker	50	242	431	22	19	21,200	48,300
Deepwater Pipeline Route	54	242	431	28	18	3,200	6,800
Shallow Water Pipeline Route (direct across Santa Cruz Island)	42	242	431	13	9	3,200	6,800
Santa Barbara-Santa Catalina							
Tanker	22	67	219	60	21	3,100	13,200
Pipeline	20	67	219	24	11	600	2,600
Santa Rosa-Cortes (S)							
Tanker	81	239	660	28	21	20,200	89,400
Pipeline (pump station on Santa Cruz Island)	109	239	660	56	33	3,200	13,400

3. Behavior and Effects of Spilled Oil. Spilled oil tends to spread out after release, forming oil several millimeters thick at the center of the spill and forming a very thin film near the perimeter. These slicks are readily driven by wind and water currents.[5] The oil is distributed into the atmosphere through evaporation of the lighter fractions, mixed into the water column, and absorbed into bottom sedimentation.[6] The 1969 Santa Barbara oil spill occurred during a period of heavy rainfall. The turbid river water mixed much of the oil with bottom sediments of the Channel where its effect may be relatively long-lived.[7]

Although biological degradation of spilled oil begins almost immediately, the toxicity of oil when it reaches onshore habitats depends upon a number of factors. These follow: the size, location, and season of the spill; the chemical and physical characteristics of the oil; the period of time that the slick floats on the surface; wind and wave action; the sediment load of nearshore waters at time of the spill, and the methods used to contain or clean the spill. Because of these factors, the effects of an oil spill can vary widely making it very difficult to predict the impacts.

Crude oil may harm organisms in several ways.[8] Oil, or its water-soluble toxic components may kill directly. Organisms, or their offspring, may also be harmed through contact with carcinogenic or mutagenic compounds. Effects on an animal's behavior may include alteration of responses to predators and responses to sexual stimuli. Organisms may also be harmed indirectly through a reduction in their resistance to diseases.

Little is known about the cumulative effects of chronic oil pollution on shoreline organisms. Numerous oil seeps have occurred along the coast of Southern California. Straughan, who noted a lack of biological damage following the 1969 spill, speculated that the area's fauna may have developed a tolerance of crude oil in the water because of long-term exposure to seeps[9]; however, the impacts of a spill can cause damage far beyond the area of the spill by destroying migrating species, such as whales and birds, and by damaging coastal food webs.

4. Integrated Spill Risk Analysis. Because of uncertainties about the paths of spills off the Southern California coast and of the effectiveness of cleanup technology, the OCS Task Force is conducting an inventory of all critical, natural, economic, and recreational resources. They will incorporate these resources in an analysis of oil spill paths. Officially designated, environmentally sensitive areas and other habitats that are of particular importance are among the areas being inventoried by the Task Force. These areas will be mapped, showing relevant features including kelp beds, reefs, and islands. Spill paths are being plotted from available data on wind and wave action currents, and location of oil production and shipping. Preliminary maps of these critical areas are included in Appendix VI.

COASTAL ECOSYSTEMS COMPONENTS

Terrestrial components of the Southern California coastal ecosystem include five major vegetative communities: maritime pine forests, oak woodland, coastal sagebrush, chapparral, and coast grassland. These communities support over 250 species of resident and migratory birds,

numbering millions of individuals, including rare and endangered species. The upland habitats also support a large variety of mammals, including rare and endangered species. Some terrestrial components of the coastal ecosystems will be damaged or destroyed by the effects of oil and gas activities. Processing and storage facilities along the coast will alter habitats primarily in Santa Barbara County and possibly in San Diego County. However, the Coastal Commission's restriction of further industrialization to areas of existing industrial development, and prohibition of any new development of oil and gas facilities in biologically sensitive areas, could reduce upland destruction from OCS development.[10]

Marine components of the coastal ecosystems include rocky shores, sandy beaches, subsea canyons, estuaries, bays and marshes, and the Channel Islands. In offshore areas, nutrients are supplied from sediments and rich cold-water upwellings. The latter are especially important in California where varying amounts of nutrients are yielded each year to the inshore waters.[11] Two coastal current regimes circulate nutrients throughout the Davidson and the Oceanic regions of Southern California. Estimated rate of movement of the waters in the inshore areas is a total replacement 1 to 2 times per year, and around the islands, 3 to 4 times per year.[12]

The nutrient circulation of the Southern California current system supports representatives from 25 known phyla of marine animals and 617 known benthic marine plant species. Marine vertebrates found in Southern California waters include fishes, mammals (cetaceans and pinnepeds), reptiles, and birds.[13]

The most productive areas of the Southern California coastal ecosystems are the marshes, bays, estuaries and mudflats. Accounts of the most significant of these areas, the rare and endangered species they support, and estimates of resident wildlife, are included later for each county.[14]

Sandy beaches form 75% of lower California's 203 mile-long coast. The characteristics of the beaches vary from season to season and year to year depending on currents, storms, changes in offshore bottom topography, and man-made influences such as breakwaters. Ampipods and isopods scavenge in the intertidal habitat of the shore. Sand crabs, Emerita analoga, are seasonal organisms which inhabit the surf zone. Extremely abundant, sand crabs provide food for several species of fish. The bean clam, Donax gouldii, is also found in the surf zone sand in large numbers. At depths beyond the coastal surf zone to 35 feet, a number of larger organisms form communities frequently based on aggregates of sand dollars, Dendraster excentricus, and in some cases various species of clams.

Below 35-foot depths, the bottom slopes gently seaward, except in regions of canyons. This sloping bottom is the habitat of clams, snails, worms, crabs, sea pens, flatfishes, rays, perch, and croakers. Depths of 60 to 600 feet support populations of nudibranchs, sea cucumers, starfish, sea urchins, brittle stars, worms, crabs, brachiopods and echiuroids in certain areas and carnivorous crabs, snails, and fishes that come to prey on the residents. Eels, sharks, rays, perch, rockfish, and occasional whales and sea lions also occur.[15] Another important component of the biota of shallow coastal waters are those

organisms that drift or migrate through. These include mussels, tunicates, red algae, and the young or larval forms of a variety of marine species.[16]

The eight Channel Islands are unique in terms of diversity of biota. The islands lie within the California coastal current system and may receive marine larvae from areas thousands of miles away.[17] The islands have some unique biotic components. The common element is a blend of marine biota of the central Pacific Ocean provinces, and the mainland coasts of Southern California. The islands (only seven are listed) and major plant and animal forms are listed below:

San Miguel: Sea lion, elephant seal, and stellar sea lion rookeries.

Santa Rosa: Northern California flora and fauna mixed with typical southern species.

Anacapa: A national monument. Nesting site for pelicans and other sea birds.

San Nicholas: Unique rookeries for pinnipeds, extraordinary sand beaches, unusual and possibly unique invertebrates and fish elements.

Santa Barbara: A national monument. Pinniped rookeries. Overgrazed by man-introduced rabbits.

Santa Catalina: Extraordinary diversity of marine flora. Unique species of invertebrates and fishes occur including the isolated Chaenopsis.

San Clemente: Naval target range. Biota unknown. Species of algae, mantis shrimp and phoronids occur.

SHORELAND HABITATS

A county-by-county description of the most significant shoreline habitats and the potential impacts form OCS oil and gas development are given in the following paragraphs. Although habitats in San Diego have been described along with rare or endangered species that they support, no attempt has been made to assess OCS-related impacts because there are no plans for nearby oil and gas development. Leasing of tracts along the San Diego coast in Sale 48 will affect these areas, but more precise identification of threatened areas will have to await identification of leased tracts.

San Diego County

1. Border Field State Park, a tract of 300 acres located near the Mexican border, is the home of a rich diversity of fauna and resident and migratory birds. It supports six rare plant species: Agave shawii, Cereus emoryi, Cordylanthus maritimus, Dudleya attenuata, Echinocactus viridescens, and Opuntia parryi var. serpentina.

2. Buena Vista Lagoon, 220 acres, is one of the last large and relatively undisturbed lagoons in Southern California. It supports the following three plant communities: saltwater lagoons, coastal salt marshes, and freshwater marshes. The area hosts many shorebirds.

3. La Jolla Bay, Scripps Submarine Canyon and La Jolla Submarine Canyon is one of the most studied and richest submarine canyon systems in the world. Large colonies of unique phoronids and the rare yellow sponge, Polymastia pachymastia, (cnly known site) occur in the system. The canyon floor and walls support dozens of plant and animal species,

including the unusual anemone Metridium senile and the orange sponge Ficulina suberea. The bay is frequented by a diverse mixture of fishes, whales, squid, and other invertebrates. It is in public ownership.

4. Los Penasquitos Lagoon (also known as Torrey Pines Lagoon), 385 acres, is also an important coastal salt marsh. It supports four plant communities and a rich variety of plant and marine life in tidal channels, mud flats and salt marshes. The rare Lotus nuttallianus occurs in the area. Sixty-eight species of shore and migrant birds have been spotted in the lagoon, including three endangered species: the lightfooted clapper rail, Rallus longirostris levipes, Beldings savannah sparrow, Passerculus sandwichensis beldingi, and the California least tern, Sterna albifrons browni. The lagoon also harbors 21 species of fishes, plus molluscs and crustaceans.

5. Santa Margarita River Estuary, 600 acres of Camp Pendleton, is the only unspoiled watercourse terminus in Southern California. It consists of several hundred acres of salt marsh and is the home of the largest breeding colony of the endangered California least tern. Over 40 species of fish have been identified in the estuary, along with dozens of migratory and resident wildfowl.

6. South San Diego Bay consists of 3,890 acres of hypersaline marsh, bay waters, marshes and mudflats. It supports extensive beds of algae and the rare plants: Erysimum ammophilum, Lotus nuttallianus, and Frankenia palmeri, along with 99 species of birds and 22 species of fishes and many invertebrates. It is the home of three endangered species: the least tern, the clapper rail, and the California brown pelican, Pelecanus occidentalis californicus.

7. Tijuana River Slough near Border Field is 900 acres of public lands forming the best pure marine slough in the state. The channels and mudflats support 173 species of birds, including the endangered brown pelican, the least tern, the clapper rail, Beldings sparrow, and the peregrine falcon Falco peregrinus anatum. Twenty-six species of fish have been observed in the slough along with many invertebrates.

Orange County

1. Anaheim Bay, located seven miles north of Huntington Beach, contains about 520 acres of marsh and mudflats. Surrounded by development, it remains in near-pristine condition and supports large numbers of migratory and resident birds including the endangered lightfooted clapper rail, the least tern (breeding colony), and Beldings sparrow. The bay also serves as a fish nursery and is the only spawning site of the cherry-stone clam, Mercenaria mercenaria, on the west coast.

2. Bolsa Bay, 1,450 acres, is much closer to OCS-related development at Huntington Beach (two miles) and has already been drastically altered during the last century by oil-related operations. However, there remains a great potential for restoring the bay's natural capacity and health, according to the Department of Fish and Game.[18]

3. Santa Ana River and Upper Newport Bay, located behind Huntington Beach State Park, is one of the important areas of marsh and estuary lands indentified by the Department of Fish and Game as a "critical wildlife area." It is a breeding ground for the endangered clapper rail and home for 155 bird species and 61 fish species. Development along the Santa Ana River would directly affect the

Huntington Marsh and estuary wetlands at its mouth, disturbing or removing a rare component of the California ecosystem. Spills from San Pedro lease tracts or oil transportation and storage facilities near the river pose a threat to both.

Los Angeles County

Los Angeles County has seventy-four miles of coastline. Nine miles are rocky shore and fifty-one miles are sandy beach. The remainder is developed harbor. Only 270 acres of what were once vast tidal marshes remain unaltered. The acreage provides an "island shore habitat" for wildlife in the county.

The Department of Fish and Game has identified Bixby Slough, Malibu Point, Ballona Creek and Colorado Lagoons as areas of "critical wetland wildlife importance." The Fermin Marine Life Refuge, off the coast of Palos Verdes Peninsula, supports abalone, lobster, rockfish, mackerel and other marine species despite heavy sewage pollution.

The Santa Monica Bay coastline is primarily sandy beach and is heavily used by people during the summer. Further south, the old Venice canals and Ballona Creek estuary marsh serves as habitats for fish and birds and some invertebrates, but they are polluted by wastewater discharges.

Any further oil producing operations would increase the potential for spills and thus threaten both the sandy beach and estuary marsh components along the coast. Staging cleanup equipment at or near the Santa Monica Pier, Marina del Rey, or Kings Beach would not threaten the

area, but staging operations would increase the treat to marsh and estuary habitat at Ballona Creek. Expansion of oil operations at El Segundo would also threaten the entire area if a spill were to occur from unloading tankers or damaged oil tanks.

Palos Verdes Penisula Coastline is rich in sea birds, sea mammals, and invertebrates. The area's coves and beaches also serve as a spawning ground for the grunion, Leuresthes tenuis. The California Department of Fish and Game is operating a kelp re-establishment program in the area's Abalone Cove.

The Palos Verdes Peninsula is subject to environmental damage from urbanization, from sewage flows, and from oil spills from the harbor area. The addition of OCS-related onshore industry would increase the possibility of oil spills. Present water quality degradation has already resulted in fin-rot disease in local fishes. The Coastal Plan singled out numerous sites in the area as "special marine environment, wetlands or estuaries" and recommended 482 acres for purchase.

Ventura County

Ventura County's mainland has 41 miles of coastline, consisting of 38 miles of sandy beach and 3 miles of rocky shores. The coastal terrestrial habitat has been greatly altered in the Oxnard plain due to heavy urbanization and farming. Almost 99% of the county's shoreline is sandy beach, and 61% (23 miles) is open to the public and heavily used during the summer. This intensive use limits use by wildlife. Consequently, greater effort must be made to protect and

enhance the remaining habitats for wildlife. During the winter season, several species of birds utilize the beaches during migration, including the whimbrel, Numenius phaeopus, the sanderling, Crocethia alba, the long-billed curlew, Numenius americanus, and the American golden plover, Pluvialis dominica.

On the rocky shore portion of the coast, Bass Rocks and rocks off Point Mugu are used as roosting sites for seabirds. More important are the two Channel Islands, Anacapa and San Nicholas. These two islands provide major breeding sites for western gull, Larus occidentalis, black oyster catcher, Haematopus bachmani, and the endangered California brown pelican. In 1970 Anacapa was the only known pelican nesting site on the California coast (California Department of Fish and Game). San Nicholas Island is a hauling ground for sea lions, Zalophus californicus.

The Ventura coast also features four bays, estuaries and marshes: McGrath Lake, the Santa Clara River, Mugu Lagoon, and the mouth of the Ventura River, totaling some 2,290 acres, support vast populations of migrating and resident waterfowl. Usage is estimated at 2.5 million bird days per year or 1,000 bird days per acre.[19] The Natural Areas Coordinating Council lists 25 acreas as either unique for scientific or educational interests, or representative of the various biotic communities of the Southern California coastal ecosystem. Ten of these areas are on the coast, including McGrath Beach, Ormond Beach, and the mouths of the Santa Ana and Ventura Rivers.

Direct threats to the Ventura coast from oil and gas industrialization have been identified at Ormond Beach (a refinery and an LNG

plant), McGrath Beach (potential storage and processing at the Union Oil terminal), and the Ventura River (upstream water pollution caused by increased oil processing and refining activities). Development of LNG or refining facilities at Ormond Beach would likely endanger or destroy the dense bed of sand dollars, Dendraster excentricus, lying just off the beach.

San Nicholas and Anacapa Islands potentially are the path of spills from OCS operations. Rookeries and hauling grounds on southern Anacapa Island are especially endangered because of their proximity to shipping lanes, areas of tanker collisions, or deballasting of waste oil. San Nicholas would be threatened by spills from drilling on the Santa Rosa-Cortez Ridge, which also may be suitable for nearby onshore sites for processing and storage facilities for oil.

Santa Barbara County

The inaccessibility of 85% of the Santa Barbara County coastline makes it one of the least disturbed areas along the Southern California coast. The 110 miles of coast includes 86 miles of sandy beach and 24 miles of rocky shore. Three Channel Islands lie within County jurisdiction. Terrestrial areas of the county support 300 species of birdlife, 51 species of mammals, and 28 species of reptiles and amphibians.

The California Department of Fish and Game lists three large areas in the county as important bays, lagoons, marshes, and estuaries. They are the Santa Ynez River estuary, Goleta Slough, and El Estero (Carpinteria Marsh), which together represent 720 of the 900 wetland acres along the Santa Barbara Coast. The Channel Islands, a major

component of the county's coastal ecosystem, provide nesting and roosting areas for numerous bird species. In 1970 a California Department of Fish and Game census accounted for 2,900 elephant seals, Mirounga angustirostris, and 9,800 California sea lions, along with breeding pairs of other marine mammals.

Impacts from accelerated OCS oil and gas development include increased potential for oil spills along the Point Conception to Naples coastline (because of the development of the Santa Ynez Unit) and spill damage to the Naples/Santa Barbara coast (because of accelerated development of the Ellwood offshore fields and new tracts leased in Sales 35 and 48). The Naples/Santa Barbara sale area includes leases seaward from the Goleta Slough and Devereaux Slough, and the reefs at Naples and Coal Oil Point. According to the County Plan, the Goleta Slough is one of perhaps ten tidal marshes on the California coast that is relatively unaltered by man's activities. The Slough supports a diverse population of birds and marine organisms including several rare and endangered species. The Goleta Slough, on the campus of the University of California at Santa Barbara, is the home of the rare legless lizard, Aniella pulchra, and several unusual and endangered species.

There are direct threats to the Naples Reef by a proposal from AMINOIL to build a marine terminal on the reef, and by ARCO's request to expand operations from Platform Holly and possibly construct a new platform off Coal Oil Point.

El Estero contains 200 acres of freshwater marsh habitat and provides over 170,000 bird days of use per year. El Estero lies just north

of Carpinteria, and could be affected by an expansion of SOCAL's Carpinteria oil and gas operations (approved by the State Lands Commission) on leased tracts in Pitas Point, and from oil spills from tanker loadings at SOCAL's marine terminal.

FISH AND SHELLFISH

California coastal waters support 554 species of marine fish. Miller and Lea[20] reported that 481 species (87%) occurred in the waters off the Southern California coast. Trawl samples taken by the Southern California Coastal Water Resource Project (SCCWRP) in 1969 to 1972 revealed that at least 121 species representing 41 fish families populated the Continental Shelf at depths of 10 to 360 meters.[21] Dover sole, Microstomus pacificus, was the most abundant species, although each area surveyed showed a different dominant species. The most abundant fish in the SCCWRP samples was the speckled sanddab, Citharichthys stigmaeus, followed by the Pacific sanddab, Citharichthys sordidus, and the stripetail rockfish, Sebastodes saxicola. The two species that composed the bulk of the pelagic fishes were the northern anchovy, Engraulis mordax, and the jack mackerel, Trachurus symmetricus. The study noted that more bonito, yellowtail, seabass, and barracuda moved north temporarily from Mexico to Southern California during warm water periods.[22] In winter the more northerly species such as salmon moved into Southern California waters.[23] No rare or endangered fishes are listed for the Southern California coast.[24]

Shellfish found in the coastal waters of Southern California include crab, lobster, shrimp, abalone, clams, mussels, oysters, scallops, squid,

and octopus. Except for squid, a predominantly nearshore species used extensively for bait, important commercial and sport invertebrates are found almost exclusively along the rocky coasts. Abalone, Haliotis spp., market crabs, Cancer spp., and the California spiny lobster, Panulirus interruptus are species of primary economic importance and were valued at $1.2 million in 1973. Shellfishes form an important link in the ecological chains of the Southern California Bight, and because many species are benthic and have larval forms that are especially sensitive to oil pollution, shellfishes generally are highly vulnerable to oil spills. A list of marine finfishes and shellfishes found in Southern California can be found in Appendix IV.

If spills occur in shallow areas such as the Cortex-Tanner Banks, long-term destruction of finfish and shellfish may almost certainly occur because of the mixing of oil in the water column and settling on the bottom. Pristine-like areas such as the Banks are thought to be especially vulnerable to pollution because no tolerance has been built up by finfishes and shellfishes in the area.

BIRDS AND WILDLIFE

The marine environment of Southern California supports 158 species of birds.[25] Sixty species use the open waters of bays and estuaries whereas the interbay and emergent vegetation areas support 50 and 10 species, respectively. Fifteen species of birds inhabit the rocky shore areas, 57 species are found in the inshore areas, and 37 in the offshore waters.

The greatest number of individuals and species are found during spring and fall migrations along the Pacific Flyway of Southern California. Less than 18% of the birds (28 species) found during the migration breed in the region. The single most abundant species, the sooty shearwater, Puffinus griseus, breeds in the southern hemisphere.

Four species of marine birds in Southern California are endangered. They are the brown pelican, the clapper rail, the black rail, Laterallus jamaicensis, and the least tern.

The wildlife primarily affected by OCS development are the marine mammals, although some upland species suffer habitat loss due to oil and gas processing and to construction of storage facilities in canyons and on bluffs along the coast. Thirty-six species of marine mammals are known to inhabit the entire California coast, but the rarity of some species limit life history studies to about half of the total.[26]

Many animal species, such as seals and seal lions, depend upon land for part of their life cycle. Other marine mammals such as the cetaceans and the sea otter, Enhydra lutris, spend their entire lives in the water. Seven pinnipeds reported in the Southern California Bight use breeding grounds and haulout areas on the islands and some remote spots along the coast. The cetaceans found commonly in the region are the California grey whale, Eschrichtius robustus, which migrates annually from the Bering Sea to Mexico and back; the bottom-nose dolphin, Tursiops truncatus gilli; and the harbor porpoise,

Phoca vitulina. The harbor porpoise if found in bays and river mouths as far south as Los Angeles, and the dolphin is found in inshore bays and lagoons. Sea otters occur primarily along the coastal kelp beds and near-shore areas north of Point Conception.

KELP

Beds of kelp, Macrocystis pyrifera, are present all along the southern and central coast of California from depths of 100 feet to the surface.[27] In ecological terms, these beds may be 100 times more productive than an adjacent sandy bottom and function to reduce the influence of waves and surge on the shoreline. The kelp itself is food for abalone, crabs, snails, and other grazers, and the fronds provide an attachment surface for a variety of organisms, creating a unique biota of bryozoans, hydroids, and nudibranchs. The kelp canopy also feeds the mysids which are in turn a basic component of the food chain of inshore fishes. A wide variety of organisms occur in association with the holdfast of kelp. Kelp is an important renewable resource that is harvested regularly as a source of algin for food, cosmetics and coatings.

Kelp beds are usually the first to feel the impact of spills and leaks. Kelp found along the shores of Southern California is frequently covered with oil and tar deposits. Further research is needed to ascertain kelp's tolerance for oil contamination and the role of kelp in collecting and concentrating oil.

PUBLIC INTERESTS

Public interest in the protection of the coastal ecosystem is high in the Southern California area. Literally hundreds of organizations work to protect various habitats and/or species, and to prevent oil or oil-related damage. Two references that provide a complete list of organizations concerned with the living resources are: Sierra Club International Environmental Directory, available from the Center for California Public Affairs, Claremont, California, 91711, and Conservation Directory, 1976, available from The National Wildlife Federation, 1412 - 16th Street, N.W., Washington, D.C. A list of organizations concerned with the protection of marine mammals and general coastal ecosystems appears in Appendix V.

Footnotes

1. Easton, R. 1972. Black Tide: The Santa Barbara Oil Spill and Its Consequences. Dela Corte Press, New York. p. 203.

2. National Academy of Sciences. 1975. Petroleum in the Marine Environment. p. 75; Coastal Guard estimates reported in Kash, et al. 1973. Energy Under the Ocean. p. 292.

3. See Onshore Impact of Offshore Southern California OCS Sale #35, OPR, January, 1976. V-1ff for summary of oil spill predictions.

4. The USGS in DES 75-35 on the Channel development did not estimate spillage; the report said such estimates resulted in "meaningless conclusions," Vol. II, III-35.

5. See 1975 Conference on Prevention and Control of Oil Pollution. Sponsored by American Petroleum Instaitute, EPA, and U.S. Coast Guard, San Francisco, March 25-27, 1975. Santa Barbara Oil Symposium. December 16-18, 1970, sponsored by National Sciences Foundation and University of California, Santa Barbara.

6. Kreider, R. E. 1971. Identification of Oil Leaks and Spills. In Proceedings, Joint Conference on Prevention and Control of Oil Spills. p. 119-124.

7. Kolpack, R. L., et al. 1971. Hydrocarbon Content of Santa Barbara Channel Sediments. In Biological and Oceanographic Survey of Santa Barbara Channel Oil Spill. Vol. II. p. 276-295.

8. Evans, D. R. and D. Rice. 1974. Effects of Oil on Marine Ecosystems: A Review for Administrators and Policy Makers. Fishery Bulletin. Vol. 72, No. 3. p. 625-638.

9. Straughan, D. 1971. Breeding and Larval Settlement of Certain Intertidal Invertebrates in the Santa Barbara Channel Following Pollution by Oil. In Biological and Oceanographical Survey, op. cit., Vol. I, p. 223-244.

10. See S.B. 1277, sections 30001.2, 30007.5 and 30233,

11. Fay, R. C., et al. 1973. Southern California's Deteriorating Marine Environment. Center for California Public Affairs. Claremont, California. p. 33.

12. Jones, J. H. 1971. General Circulation and Water Characteristics in the Southern California Bight. Southern California Coastal Water Research Project. Los Angeles, California.

13. Fay, Ibid.

14. California Department of Fish and Game. January, 1976. At the Crossroads, 1976: A Report on California's Endangered and Rare Fish and Wildlife. Department of Fish and Game, California Resources Agency, Sacramento, California.

15. Fay, op. cit.

16. Fay, pp. 37-38.

17. Fay, p. 48, is the basis for description of the islands.

18. Unless otherwise noted, descriptions of shoreline habitats were taken from the Inventory of California Natural Areas, compiled and published by the California Natural Areas Coordinating Council, 1975; and The Coastal Counties Fish and Wildlife Resources and Their Utilization, California Department of Fish and Game, Marine Resources Branch, August, 1973.

19. Young, R. 1973. Return to Bolsa Chica. Outdoor California. 39. p. 1-3, April 1976. All population estimates and census figures are from The Coastal Counties Fish and Wildlife Resources, cited above.

20. Miller, D. J. and R. N. Lea. 1972. Guide and the Coastal Marine Fishes of California. Department of Fish and Game, Sacramento, California. Bulletin #157. 1-235.

21. Southern California, Coastal Regional Water Research Project. 1973. The Ecology of the Southern California Bight: Implications for Water Quality Management. Chapter 7. Coastal fish populations. El Segundo, California. p. 193-203.

22. Frey, H. W., ed. 1971. California's Living Marine Resources and Their Utilization. Department of Fish and Game, Sacramento, California.

23. California Department of Fish and Game. November, 1971. Fish and Wildlife in the Marine and Coastal Zone. Department of Fish and Game, Sacramento, California. Part A. p. 48.

24. At the Crossroads, Department of Fish and Game (report on state's endangered species). January, 1976.

25. Scott, J. M. April, 1974. Marine Birds of Southern California and Their Relation to the Oil Industry. Prepared for the Western Oil and Gas Association. Los Angeles, California.

26. Hester, F. J. February, 1974. The Marine Mammals of Central and Southern California and Baja, California. Prepared for Western Oil and Gas Association, Los Angeles, California.

27. This section drawn from Fay, op. cit. p. 47-48.

V. SOCIOECONOMIC IMPACTS

Offshore oil and gas development is commonly divided into five major activities: exploration, establishment of onshore base of operations, (including equipment fabrication), production, transportation, and processing. The area of base operations generally is the center of major socioeconomic impacts, although construction and operation of new refineries, if required, have the largest long-term effects on a community or a region. OCS development results mainly in the creation of new employment, which in turn creates secondary employment and growth. Capital investment, rather than employment, is more associated with exploration, production, transportation and processing activities.

Employment generated by OCS development was assessed for the Atlantic Coast.[1] The total number of jobs was projected from development plans and these figures were used as a basis for estimating secondary employment and demand for new development and services. The OCS Task Force conducted an exhaustive study of the characteristics of oil-related labor in the Southern California region. Socioeconomic impacts from new jobs created in OCS development could not be accurately estimated because not all the jobs generated by oil and gas operations were filled by new residents. Also, not all imported labor for OCS-related projects remained in the state long enough to generate demands for new housing, services, and secondary employment. Further, new offshore service companies would not tend to locate in California because the state already has a large offshore service industry capable of meeting the demands of OCS development in the region.

Table 9. Potential OCS Related Employment in Southern California (Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Gas Development: Southern California - Preliminary Draft, Sacramento, California [OCS Sale No. 35 Summary (in man-years)])

Year	Exploratory Drilling		Support Services		Development Drilling		Platform Fabrication		Onshore Facility Construction		Onshore Facility Operation		Production Operations	TOTALS BY YEAR
	Total	Local[1]	Total	Local[2]	Total	Local[3]	Total=	Local[4]	Total=	Local[5]	Total=	Local[6]	Total= Local[7]	Manyear Basis
1976	388	268	300	264	--	--	--		--		--		--	688
1977	775	535	300	264	--	--	--		--		--		--	1075
1978	775	535	300	264	200	122	200		--		--		--	1475
1979	775	535	300	264	300	183	300		75		--		--	1750
1980	775	535	300	264	400	244	300		150		40		40	2005
1981	388	268	300	282	400	244	400		150		80		80	1798
1982	194	134	300	282	400	244	400		150		80		80	1604
1983	130	90	300	282	400	244	400		300		160		160	1850
1984	--		300	282	400	244	400		300		200		200	1800
1985	--		300	282	400	244	300		150		310		320	1780
1986	--		300	282	300	183	300		150		310		320	1630
1987	--		300	282	200	122	200		75		310		320	1405
1988	--		300	282	200	122	--		--		310		320	930
1989	--		300	282	--	--	--		--		310		320	930
1990	--		300	282	--	--	--		--		310		320	930
1990-95			300	282							310		320	930
1995-2000			300	282							310		310	930
-			↓								↓		↓	
-														
-														
-														

Notes

1. Imported = 31%, Local = 69%; this total doubles on jobholder basis.
2. Imported = 12%, Local = 88%, local share rising to 94% after 5 years.
3. Imported = 39%, Local = 61%; total doubles on jobholder basis.
4. Represents Southern California share; for total California share, double.
5. Construction labor virtually 100% local.
6. Facility operation virtually 100% local.
7. Mostly local; on jobholder basis, total would double.

The Task Force calculated the net, new labor and service that would be attracted to the state as a result of OCS development (summarized for Sale 35 in Table 9). The staging of development, that affects the total employment in any one year, is also considered in Table V-1. Peak employment is projected to occur in 1980 and reach about 2,000 new jobs. This figure is insignificant in comparison to the Southern California, oil-related labor force of 21,000 and total labor force of 6 million.[2] The OCS Task Force concluded that Sale 35 will have no noticeable socio-economic impacts on the overall Southern California area and slight, if any, local impacts.

Sale 48 also does not appear to be a major generator of economic or labor impacts in the near future for Southern California for the following reasons:

1. The majority of areas nominated by the industry are in deep water which presents special problems that will slow development.

2. Nominated tracts in shallow waters are in wildcat areas that require long lead times for field location and definition.

3. Production from nearshore tracts leased in the San Pedro Bay and the Santa Barbara Channel will not likely require additional processing and storage facilities.[3]

However, there is potential for additional development as a result of the combined production from Sale 35, Sale 48, importation of Alaskan oil, and new LNG facilities on the coast. Planned expansion includes the Los Angeles and Long Beach Harbors, described above in III, the El Segundo refinery, and three processing and storage plants in Santa Barbara. Also, some of the 60 platforms required for

development of the Santa Barbara Channel, and those that will be required to develop oil potentials of Sales 35 and 48, will be built in Southern California shipyards if this is less costly than transporting rigs from the North Sea area. Two of the five shipyards in the Southern California region, the Todd in San Pedro and NASCO in San Diego, are capable of rig construction. Both are booked for at least the next year with contracts for vessel construction, but the others have the capacity for vessel and rig subassembly and repair work. However, industry has demonstrated a strong tendency to build the necessary platforms outside of the Southern California area. At least 12 of the 16 platforms installed in State or Federal waters offshore California were constructed in part or in whole in northern California or in the Gulf area.[4]

Additional facilities are expected to be constructed in the target areas identified by the OCS Task Force to accommodate production from Sales 35 and 48. Processing and storage will have to be developed in the San Diego area to accommodate production from finds in the southern tracts of Sale 48. However, the economic analysis of the Task Force indicates that the net number of jobs and secondary development will probably be insignificant in both the region and local economies.[5]

The OCS Task Force is currently re-examining employment and socio-economic impacts of Lease Sale 35, based on the tracts actually leased and new development in the Santa Barbara Channel. A description of this work, which is under contract to a public interest economic analysis firm, appears in Section VI.

PUBLIC INTEREST AND ATTITUDE

Public and government response to the accelerated OCS leasing program and the environmental issues it raises for California has been quite obvious. Two governmental organizations, in addition to the OCS Task Force, were formed to consider the dangers posed by leasing and development. The Southern California Council of Local Governments, organized by Los Angeles Mayor Tom Bradley, and the Santa Barbara County Task Force, organized by Albert Reynolds, Director of the Santa Barbara County Office of Environmental Quality.

The Southern California Council of Local Governments concerned with the federal government's proposal for accelerated OCS oil and gas development consists of the following: the Cities of Los Angeles, San Diego, Beverly Hills, Santa Monica, Santa Barbara, Riverside, Newport Beach, Torrance, Palos Verdes Estates, Rancho Palos Verdes, Laguna Beach, Huntington Beach; the Counties of San Diego, Santa Barbara, Orange; and the Southern California Association of Governments.

Representatives of twenty-six organizations testified at the hearings on the Draft Environmental Impact Statement on Sale 35. Hearings on the Draft Environmental Statement on development of Santa Barbara Channel OCS lands drew speakers from eight local environmental groups, and several local and State officials also spoke. Among those who testified in opposition to development were Congressman Charles Teague, Assemblyman Don MacGillivray, Santa Barbara Mayor David Shiffman, Santa Barbara Supervisor James Slater, and representatives of the State Division of Fish and Game and the League of Women Voters.

Two organizations formed to respond to OCS leasing were the County Task Force and the Council of Local Governments. These groups presented well-researched and documented reports to the Department of the Interior, concisely cataloguing the concerns of Californians for damage to the coastal environment.[6] Issues included:

- o fear of well blowouts and tanker collisions.
- o lack of effective oil spill containment and cleanup technology.
- o pollution of pinniped breeding grounds and rookeries.
- o impacts of additional onshore facilities on land use.
- o oiling of beaches from new or accelerated seeps created by pressurization of offshore formations.
- o increased tanker traffic generating more oil spills caused by carelessness or deballasting.
- o diminution of land values and reduction of tourism because of reduced aesthetic values caused by platforms.

The Scientific Advisory Committee to the Council examined impacts of oil development on coastal vertebrates, flora, and ecosystems. Committee members expressed concern that serious impacts could result from the development of tracts leased in Sale 35 and that the Federal Government had not adequately considered possible ecological damages.

Additional insight into the interests and concerns of the Southern California public and their governmental representatives can be gained from the resolutions passed by city and county leaders concerning OCS development in general, and the comments submitted by local government on OCS development documents. The folowing jurisdictions have

passed resolutions opposing OCS development, or have gone on record stating concern about OCS development within their boundaries: the Cities of Huntington Beach, Newport Beach, Seal Beach, San Clemente, Santa Monica, Santa Barbara, and the county of Santa Barbara.

Jurisdictions that offered generally negative testimony on environmental statements regarding OCS development or participated in the critique of the BLM's Draft Environmental Statement include the Cities of Los Angeles, San Diego, Beverly Hills, Santa Monica, Riverside, Santa Barbara, Newport Beach, Torrance, Palos Verdes Estates, Rancho Palos Verdes, Laguna Beach, and Huntington Beach.

Also, the Southern California Association of Governments (SCAG), has taken a position of limited leasing or no leasing at all. This was described in SCAG's testimony to BLM on Sale 35 by Los Angeles Supervisor James Hayes and delivered orally by Mayor Robert Ward at BLM hearings on the final environmental statement in Los Angeles, California in May, 1975.

The League of Women Voters and Carl Hetrick of the University of California at Santa Barbara conducted a public opinion survey which revealed that over half of those surveyed felt that offshore oil development was a serious problem because of oil spills. However, interviews conducted by the authors in 1976 found an attitude favoring carefully controlled and regulated development as a more practical approach, primarily because there seems to be little probability of stopping oil and gas development. The leaders of several environmental groups continue to press for elimination of all oil development in the Channel.

COMMUNITY PLANNING

Planning for Sales 48 and 53 is being conducted on a day-to-day basis by the OCS Task Force headquartered in the Governor's Office. The Task Force has sent announcements to local governments in Southern California, explaining the leasing program and the call for nominations and providing local government staffs with information needed for response to the impending lease sale. To date, the Counties of Santa Barbara, Los Angeles, and San Diego; as well as, the Cities of Santa Barbara and San Diego have submitted recommendations and negative nominations on Sale 48.

There is little other on-going preparation for OCS development, although one or two administrative assistants to policy leaders in each jurisdiction usually tries to stay on stop of the Federal leasing program. The County of Santa Barbara Office of Environmental Quality keeps in close touch with the Task Force and makes numerous contacts with Federal agencies as part of on-going planning for OCS development. Some environmental organizations are keeping track of OCS-related issues, primarily the Sierra Club's Los Padres Chapter, Get Oil Out, Inc., and the Coastal Alliance.

The State Coastal Commission is also monitoring OCS development issues on a day-to-day basis and is working very closely with OCS Task Force staff to plan for OCS-related development. Local government staff members, primarily from the City of Los Angeles and the five Southern California counties, participate through regular workshops with Task Force and Commission staff, and through personal contacts. The OCS Task Force has recently held a series of workshops with

citizens, staff, and representatives of the Southern California jurisdictions most involved with OCS development. The purpose of the workshops is to discuss the Draft Task Force Report on OCS Development and to begin planning for closer coordination in response to Sale 48.

SPECIAL FEATURES

The California coastal zone and especially the Southern California coast, is a major focus of the state's population and economy. The fifteen coastal counties have a combined population of 13.3 million, 63% of the state's total population. Approximately 65% of the state's economy is concentrated in the coastal counties, including international trade, oil and gas development, fisheries, tourism and recreation, and agriculture. Two-thirds of California's work force is employed in these counties. Development of the OCS of Southern California can be expected to have an indirect effect on three sectors of the state's economy -- fisheries, tourism and recreation.[7]

1. Fisheries. Landings and imports of commercial fishes, mollusks, and crustaceans reached a billion pounds in 1973, the highest in California in 23 years. Principle contributors were anchovy and skipjack tuna, although 55 species are harvested commercially. Landings for 1972, the latest year for which complete data are available, totalled 845.7 million pounds. The South Coast Region (Los Angeles and Orange Counties) accounted for 614.6 million pounds (73%). Landings at Terminal Island in Los Angeles Harbor totalled almost 593 million pounds, and the Ports of San Diego and Hueneme also landed substantial quantities of commercial

fish. The value of the 1972 fish landings in Southern California totaled $147,391,000.

Offshore oil and gas operations can harm the fishing industry by interfering with the use of the sea floor and adjacent pelagic areas, by the creation of obstructions that damage fishing gear and by polluting the marine habitat. The potential construction of 60 platforms, for the Santa Barbara Channel (USGS estimate), and the 14 to 60 platforms in the Sale 35 area (BLM estimate), could cause a noticeable reduction of available fishing grounds if bottom-mounted platforms, each covering 2 to 5 acres, were to be used. Large areas would also be declared non-navigable if a large number of semi-submersible platforms were used (325 acres each including the anchoring system).[8] Purse-seining fishing fleets, the largest type of commercial fishery in the lease area of Sale 35, would be most affected because of the large area required for their daily fishing operations. Heaviest fishing occurs on the San Pedro shelf, Cortez-Tanner Banks and other shallow areas, all likely sites for oil production. Unburied pipelines, and abandoned structures, tools, and equipment left on the bottom can damage or destroy seines and trawls.

Occasional large spills, or persistent small spills, could also affect the fishery through altering the ecosystems, reducing the weight and productivity of fish, and tainting of finfish or shellfish flesh with hydrocarbon odors. Wave action in shallow relatively unpolluted areas, such as the Cortez-Tanner Banks, could mix the oil in the water column and kill or injure large quantities of algae and invertebrates. The combined dangers of OCS development to the California fisheries may have

a serious economic impact. Secondary impacts could harmfully affect the fishing industry throughout the region.

2. Tourism and Recreation. The California Department of Commerce estimates that the California coast recreation and tourist trade totals $2.5 billion annually and sustains over 280,000 jobs. The Southern California Visitors Council estimates that 8.6 million out-of-state tourists spent over $2 billion in the Southern California region alone. "A Study for the Methodology for a Continuous Tourism Research Program," reported that the California coastline is a major attraction to visitors from around the world.[9] Additionally, 85% of the state's population lives within 30 miles of the coastline, and the heaviest concentration of beach users and beach residents is in the Southern California counties.

Disruption of coastal recreation by oil and gas development is possible through oiling of beaches, removal of land for oil-related uses, pollution from offshore operations, visual blight caused by platforms and onshore treatment plants, and disruption of coastal ecology and subsequent reduction or disappearance of birds and sea mammals that are closely associated with coastal waters.

BLM catalogued the various operations that could cause adverse impacts, but they did not identify specific sites because of a lack of knowledge on final development of Sale 35.[10] However, the possible construction of up to 120 platforms in the Sale 35 area and those in the Santa Barbara Channel, along with the related onshore facilities, will alter and may degrade the beauty of the Southern California coast and impair its global reputation. The negative impacts may adversely affect the tourist industry in the region and thus, affect the economy of the entire state.

Footnotes

1. Woodward-Clyde Consultants, Inc. October, 1975. Mid-Atlantic Regional Study, An Assessment of the Onshore Effects of Offshore Oil and Gas Development. Prepared for American Petroleum Institute, Washington, D.C.

2. Employment Development Department, Los Angeles Research Office (response to information request). See also "California Employment and Payrolls" published annually by the Employment Development Department, Sacramento, California.

3. Governor's Office of Planning and Resources. January, 1976. Onshore Impacts of Offshore Southern California Lease Sale #35. Office of Planning and Resources. Sections IV, V, VI, and VII.

4. Onshore Impacts of Offshore Southern California Lease Sale #35, op. cit. p. VIII-18.

5. The Bureau of Land Management estimated more OCS-related employment than the OCS Task Force, and the need for 100-200 acres of additional onshore development (FES, OCS #35 vol. II, p. 370-371.) The discrepancy apparently results from the use of better data by the Task Force. In any event, both the BLM and the Task Force concur that socioeconomic impacts of OCS #35 will be insignificant.

6. Analysis of Draft Environmental Impact Statement Regarding "Proposed Increase In Acreage To Be Offered for Oil and Gas Leasing On the Outer Continental Shelf", prepared for the Southern California Council of Local Governments, February, 1975 submitted to the Bureau of Land Management; and Report of Santa Barbara Task Force on USGS Draft Environmental Statement Draft 75-35, presented to the USGS, August 25, 1975, coordinated by Al Reynolds, Santa Barbara County Office of Environmental Quality.

7. Statistical information, unless otherwise referenced, is drawn from California Coastal Zone Economic Study, An Area Profile, and the accompanying Statistical Appendices, produced by the Research Department of the Security Pacific Bank, April 1975.

8. U.S. Department of Interior, Bureau of Land Management. August, 1975. Final Environmental Statement Outer Continental Shelf Oil and Gas General Lease Sale Offshore Southern California. Bureau of Land Management, Washington, D.C. Vol. II. p. 263ff.

9. Cited in the Coastal Plan, p. 161. No reference included; however, the assertion was collaborated by staff of the Visitors Council and the State Department of Parks and Recreation.

10. BLM, op. cit., vol. II, p. 265ff.

VI. REGIONAL INFORMATION AND ANALYSIS

CURRENT OCS STUDIES

The OCS Project Task Force in the Governor's Office of Planning and Research (OPR), Sacramento, is preparing a second generation report, Offshore Oil and Gas Development, Southern California (the first report is described in the next section). The preliminary draft was released in August, 1976. Final draft and various specific tasks as noted elsewhere in this report were to be completed by two separate contract studies in December. Public Interest Economics-West, San Francisco, is re-examining employment and economic impacts of Sale 35 based on tracts actually leased, and has extended the analysis to include new exploration and development in the Santa Barbara Channel area.

Local Government and Offshore Oil: Santa Barbara County Case Study, by Ruthann Corwin and Patrick Heffernan, is now undergoing review in draft form. It contains a history and description of current issues related to OCS development. Spill trajectory maps and an inventory of critical biological habitats along the coast and their relationships to potential oil spills are under preparation in Environmental Analysis.

The California State Lands Commission and the OPR have put together a multidisciplinary oil seep research program in response to legislative mandate. Other work is done in Universities. Starting in mid-1976, the four involved Universities and types of research were as follows: University of California, Santa Barbara, the use of remote sensing for locating and monitoring seeps; UCLA, ocean chemistry; University of Southern California, surface currents; and California State University at

Northridge, subsea geology. The Geography Remote Sensing Unit at the University of California, Santa Barbara holds other seep and oil pollution contracts and has completed studies for the Coast Guard.

In Santa Barbara, the County also is working to establish a project management team in cooperation with OPR and the State Energy Commission on the proposed Point Conception LNG facility to provide the local government with the necessary environmental action expertise. The joint Santa Barbara-Ventura County air pollution and meteorology study is examining oil and gas facility consolidation proposals, and may be able to use data on sensitive receptors being developed in Santa Barbara's HUD-funded air quality/land use planning study to predict regional air pollution impacts caused by OCS development.

A rich source of information on OCS oil and gas development in Southern California is the research being conducted under contract to the Bureau of Land Management. Numerous private and institutional contracts are involved in baseline studies and analysis of all phases of OCS development. The three-part, marine ecology study currently conducted by Science Applications, Inc. (SAI) of La Jolla, California appears to be a useful baseline study. Data were collected at 41 water column stations and 777 sediment sampling stations to determine hydrocarbon concentrations in the marine environment. Analysis includes chemical and physical characteristics of oil in the water column, the intertidal areas, and the benthic environment. Some monitoring of oil seep areas is made and a separate study of sublethal hydrocarbon effects is under way. The first report is due in mid-October, 1976, and the second at the end of October, 1976. A continuation study is being

planned for 1977. Information on on-going BLM/OCS studies in Southern California is available from the BLM Pacific Region Office in Los Angeles.

MAJOR STUDIES

(Note: This list is limited to state or local studies. Federal oil and gas-related environmental studies are available in Washington, D.C. from the BLM, USGS, and FPC.

1. State of California, Governor's Office of Planning and Research, Onshore Impact of Offshore Southern California OCS Sale 35, Draft January, 1976. Robert L. Solomon, OCS Program Manager.

This report gives basic information on offshore oil development in Southern California. Written as the State's response to Sale 35, the report focuses on those areas omitted or inadequately covered in the Federal EIS, i.e., resource estimation, oil spills, air quality, State Coastal planning, employment, and local impacts on Orange, Los Angeles, Ventura and Santa Barbara counties. A brief description of each county and its oil and gas operations is given. Potential development assumptions, target areas, and land uses are described, and impacts are estimated for local employment, housing, services, natural ecosystems, recreation and aesthetics. This document is still incomplete. However, a draft is available from the State Office of Planning and Research, OCS Task Force, 1400 10th Street, Sacramento, California 95814.

2. State of California, Legislature, The California Coastal Act of 1976, and the California Coastal Zone Conservation Commission's, California Coastal Plan, December 1975.

These documents will be California's coastal policy references for the coming years. Coastal cities and counties will send local plans to the regional and state commissions for approval and certification of conformity with the Act because decisions have to be made on individual applications. The Act prescribes the policies of the state, establishes the California Coastal Commissions, and mandates the local coastal programs. Of particular interest are the policies on industrial development of the Act (sections 30260-30263) which are based on environmental impacts on petroleum development, refineries, tanker terminals, and LNG facilities as set out in the Plan (pp. 117-138). Also useful are the descriptions of the coast by subregions and the summary and plan maps in the Regional Summaries Section of the Plan. Copies of the Plan are available for $4.50 each from the Documents and Publication Branch, P.O. Box 20191, Sacramento, California 95820, and copies of the Act (SB 1277, signed September 29, 1976) from the State Legislature, State Capitol, Sacramento, California 95814.

3. Security Pacific Bank, California Coastal Zone Economic Study, An Area Profile, and Statistical Appendix (two volumes), April, 1975.

This study was done in response to the planning mandate of the California Coastal Act of 1972 to provide background data for economic analysis. Data up to 1974 was given by county and region, and for the planning area which extends five miles inland from the ocean. A 1,000-yard boundary (the permit area) was also used in the Statistical Appendix. The profile covers geography and climate, public land ownership, population and employment trends, personal income, retail trade, financial institutions, housing, building and construction, home price trends,

assessed value of property, basic industries, international trade, and transportation. Statistics in the Appendix are grouped by 1970 census data, California economic trends, and international trade data. The reports are available from the Bank, Public Affairs Research Department, H8-2, Post Office Box 2097, Terminal Annex, Los Angeles, California 90051; the Profile is $10,00, Appendix $15.00.

4. California Natural Areas Coordinating Council, Inventory of California Natural Areas, Berkeley, California 1975-On.

This report is an on-going inventory which covers over 1,250 important botanical, zoological, geological or paleontological sites in loose-leaf, quarterly installments. Each entry names and locates the area and ownership. Key environmental features, plant and animal species, trends of public use and current status are given for each item. Complete state and individual county subscription rates are available from: Box 4000J, Berkeley, California 94704.

5. State of California, Department of Fish and Game, The Coastal Counties Fish and Wildlife Resources and Their Utilization, August, 1973.

This basic review document gives, for each county, some coastline statistics on public access and parks, and wildlife conservation board projects. Wildlife habitat and species abundance are described for the uplands, wetlands, sandy beach, and rocky shorelines. Use of wildlife and fish (commercial and sport) are described, including major sport fishing areas, as well as wetlands possessing wildlife habitats of critical importance, and marine life refuges and preserves. Write California State Department of Fish and Game, Marine Resources Branch, Sacramento for this report.

6. Mayor Tom Bradley et al., Analysis of Draft Environmental Impact Statement Regarding "Proposed Increase in Acreage to be Offered for Oil and Gas Leasing on the Outer Continental Shelf", prepared on behalf of the Southern California Council of Local Governments, February, 1975.

The Southern California response to the draft EIS contains a summary and critique of the OCS leasing program and the scientific data used. The scientific advisory committee reports on air quality, marine biology and botany, chemical oceanography, seismics, and manpower and material shortages. Comments are made on needed research, and on oil and gas impacts on marine invertebrates (with bibliography). Write City Hall, Los Angeles, California 90012.

7. Santa Barbara County, Office of Environmental Quality, Report of Santa Barbara County Task Force on USGS Draft Environmental Statement 75-35 (Oil and Gas Development in the OCS Lands of the Santa Barbara Channel), August, 1975.

Assembled during a short period, this report is a collection of comments from eleven County Officials, from Santa Barbara City's Environmental Quality Advisory Board and City Attorney, and from eight individuals and consultants knowledgeable on various topics. It contains statements describing local concerns, specific questions and answers, and some suggestions for research and for mitigation measures. For copies, write the Office of Environmental Quality, 105 E. Anapamu Street, Santa Barbara, California 93101.

8. Western Oil and Gas Association, Environmental Assessment Study, Proposed Sale of Federal Oil and Gas Lease, Southern California Outer Continental Shelf, October, 1974.

Although the State Office of Planning and Research and the local governments do not necessarily agree with the conclusions of this industry-sponsored report, there is much useful data in the bulk of

the report, particularly in Volume 3. This volume includes an assessment of potential environmental impacts. The appendices are separately-contracted reports on individual topics including several on Southern California fish, shellfish, birds, and mammals. Available from the Western Oil and Gas Association, 609 South Grand, Los Angeles, California 90017.

9. University of California, Santa Barbara, Oil Pollution Index Catalogue.

As a result of the spill in 1969, the University of California at Santa Barbara began a collection of oil spill and pollution-related materials covering the period 1969-71, and prepared a comprehensive index by topic and author. The catalogue was compiled for the Oil Spill Information Center and still contains much primary source material such as newspaper clippings and articles. The remainder of the material has been returned to the general collection, but call numbers are indicated in the index. The catalogue serves as a basic bibliography, covering scientific as well as popular works. The catalog is located in the Science and Engineering Library, General Library, University of California, Santa Barbara.

10. State of California, State Lands Commission, Final Environmental Impact Report, Resumption of Drilling Operations in the South Ellwood Offshore Field from Platform Holly, prepared by Dames and Moore, November, 1974.

In California, a number of EIR's have been prepared on individual oil and gas-related projects. The EIR's may be useful as references works. One reference is a State Lands EIR providing a collection of general information on the Santa Barbara Channel region, including a bibliography and 150 pages of descriptions of fish and wildlife species,

transects, and other observations. A more recent State Lands Commission Channel EIR draft on the resumption of drilling from Standard Oil's platforms off Carpinteria is about to be published.

The Santa Barbara Environmental Quality Office, responsible for that counties' EIR's, has adopted a more condensed format useful for decision-making, but providing less detailed background data. County EIR's cover Exxon's Las Flores processing site and marine terminal (final), AMINOIL's proposed Dos Pueblos marine terminal (draft), and Atlantic Richfield's Ellwood facility expansion (final). Other oil and gas-related EIR's in Southern California include the City of El Segundo's report on Standard Oil's low sulfur fuel oil project (an addition to its El Segundo Refinery, 1973), Standard Oil's draft on Estero Bay deepwater terminal and pipeline to Richmond (submitted to San Luis Obispo County, 1974), and recently completed studies by the Los Angeles Harbor District and the City of Oxnard in Ventura County on the proposed LNG terminals.

APPENDIX I

EXISTING PETROLEUM-RELATED FACILITIES
Pt. Conception to Mexican Border

Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Gas Development: Southern California (Preliminary Draft).

KEY

Primary Facilities

Onshore Separation and Treatment Facility—Gas

Oil

Gas and Oil

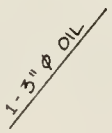
No Production

Refinery

Offshore Marine Terminal (MT)

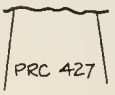
Fixed Platform

Artificial Island



Submerged Pipeline

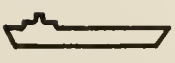
Ocean Floor Well



State Oil and Gas Lease

Secondary Facilities

Harbors and Major Marinas



Shipyards and Fixed Platform Construction

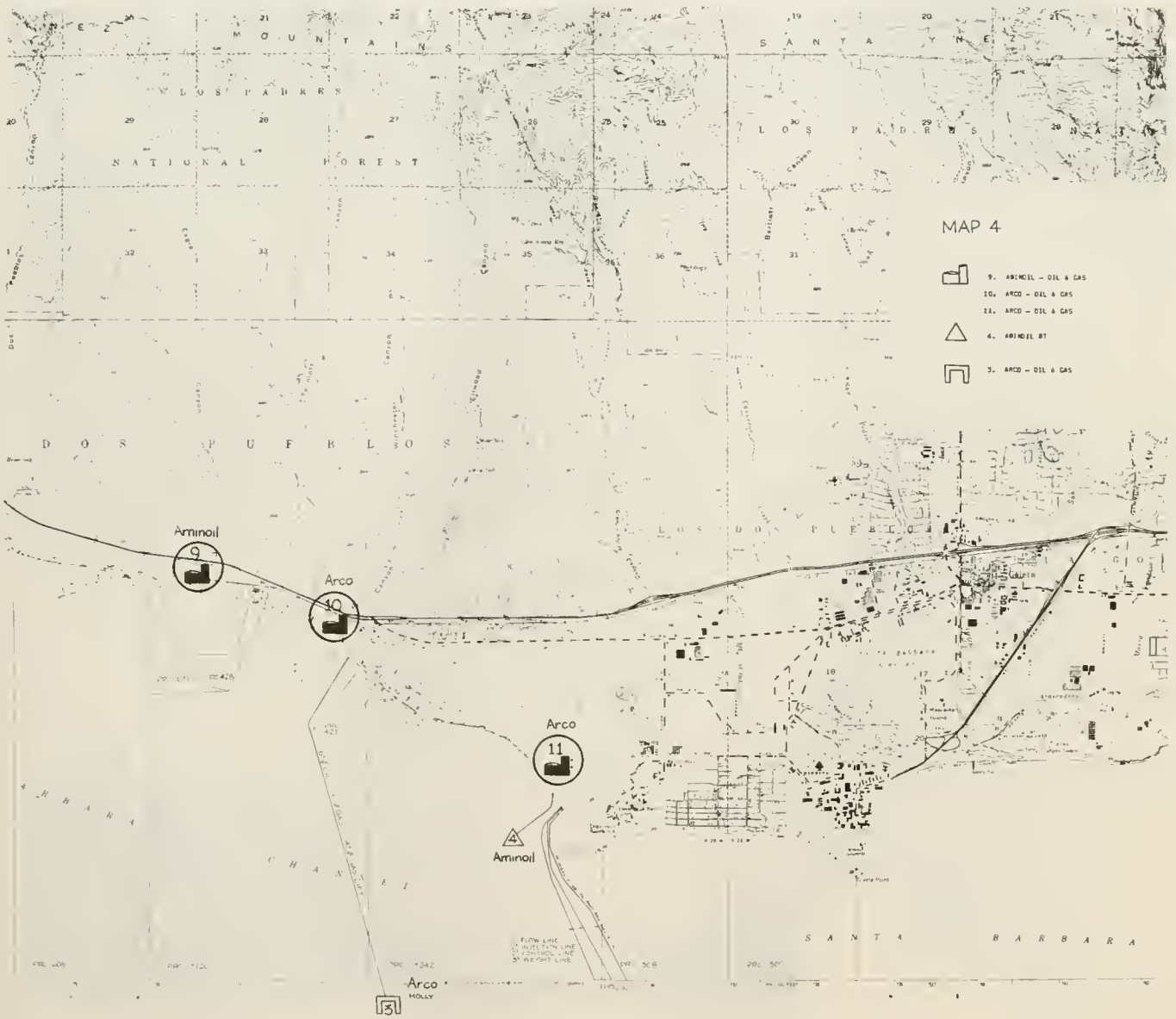
Major Drilling Contractors, Rig Owners, and Offshore Construction-Equipment Contractors

Appendix I. Map 1

Appendix I. Map 2

Appendix I. Map 3

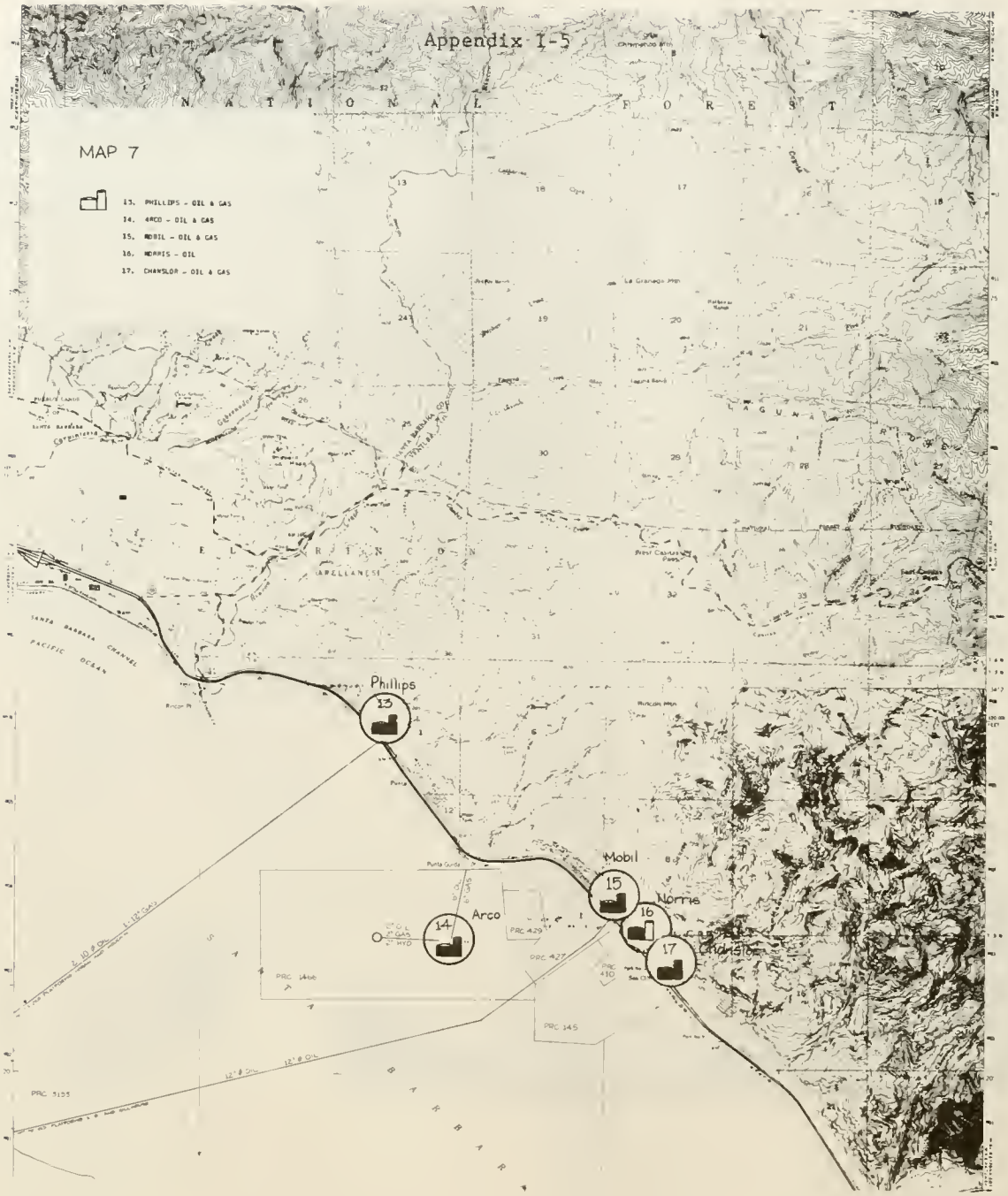
Appendix I. Map 4



Appendix I. Map 5

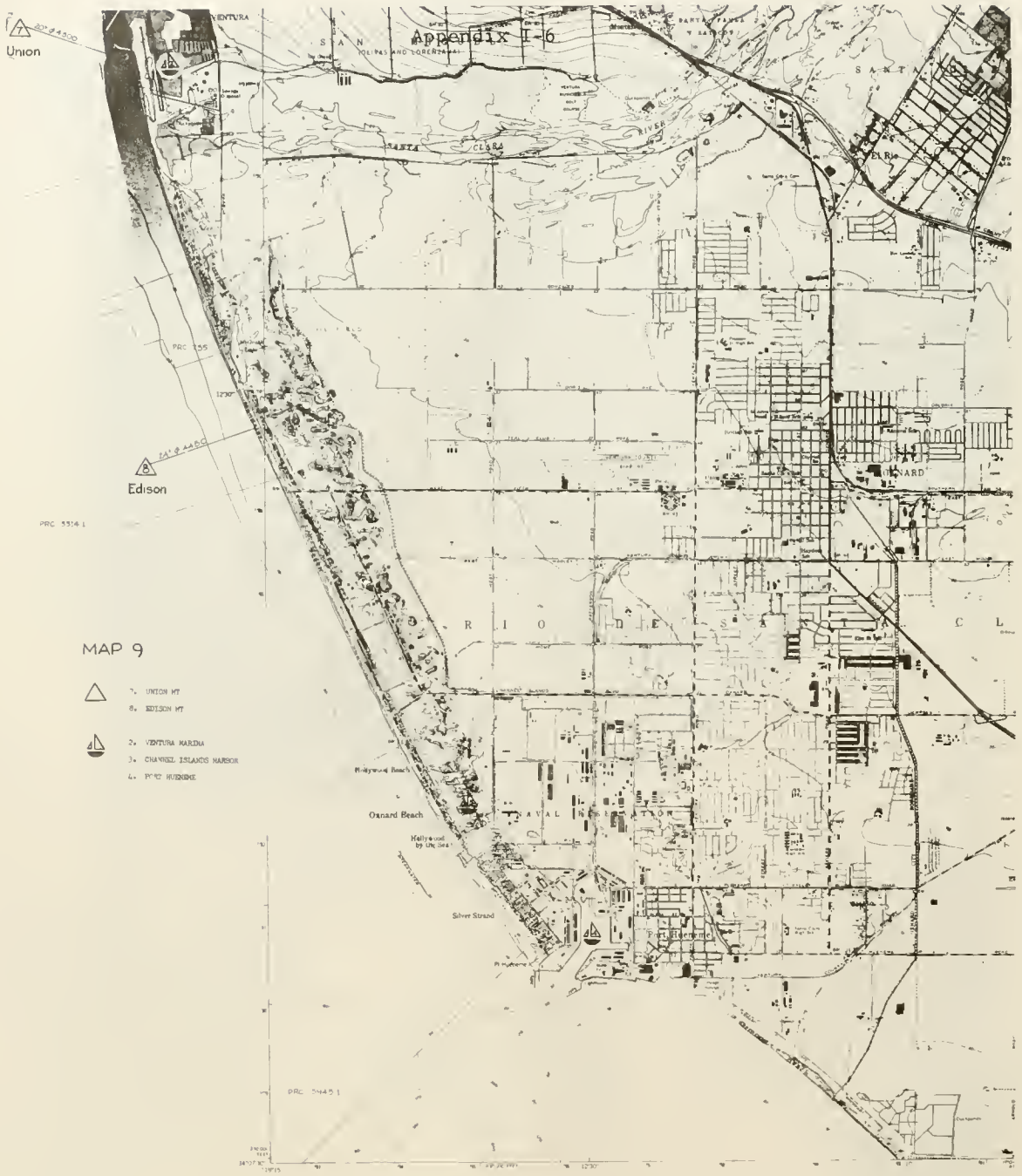
Appendix I. Map 6

Appendix I. Map 7

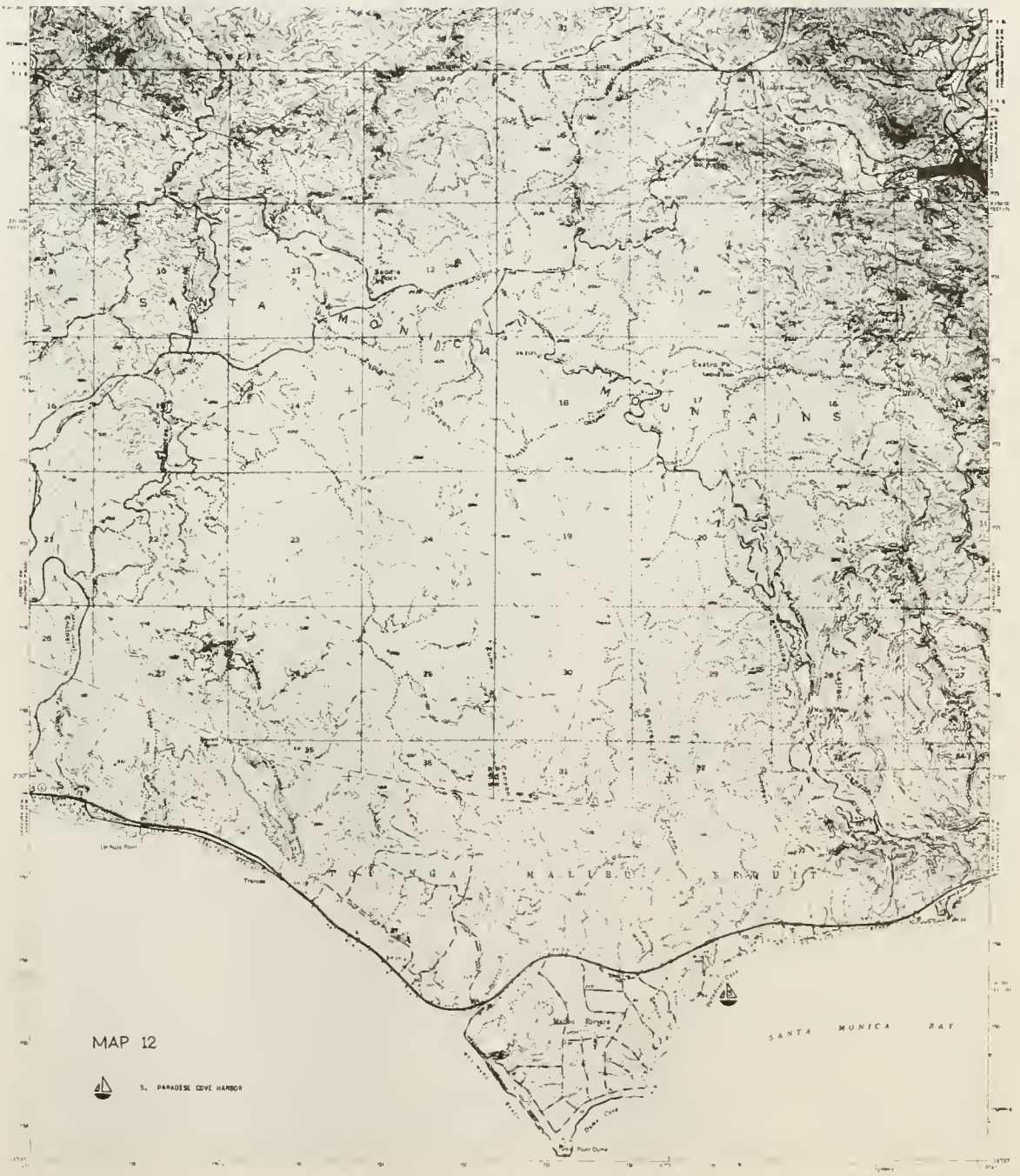


Appendix I. Map 8

Appendix I. Map 9



Appendix I. Map 12

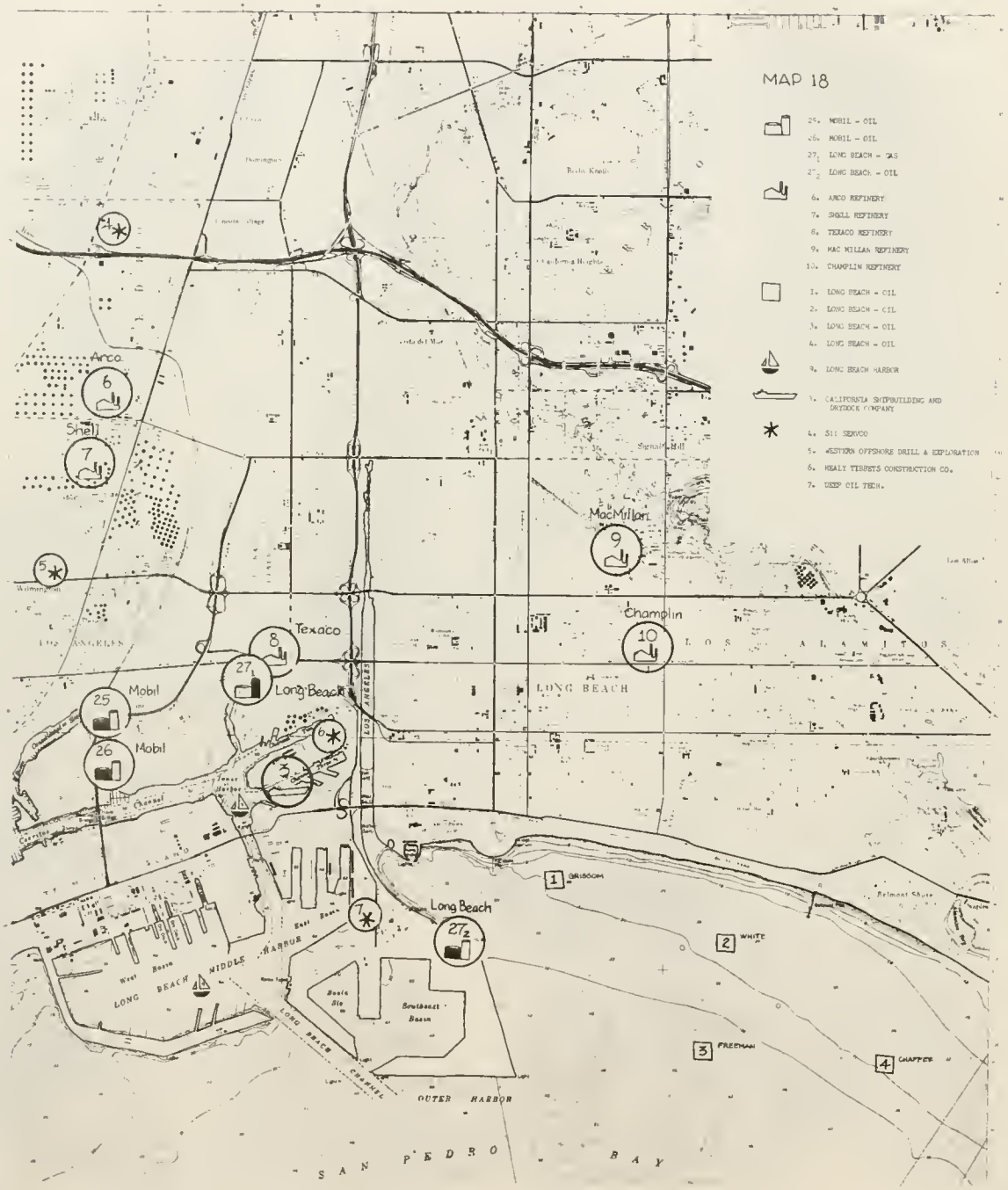


Appendix I. Map 15

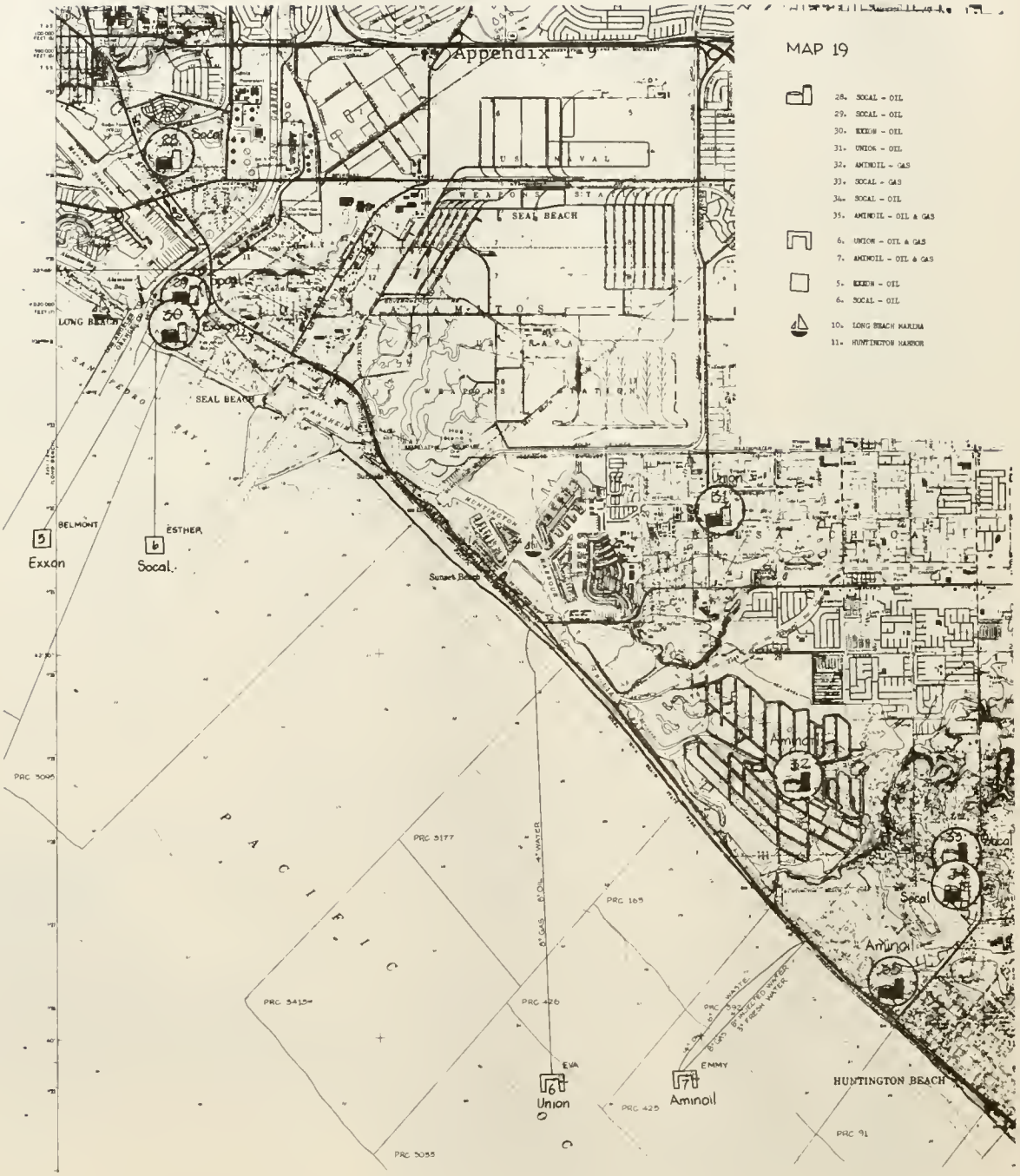
Appendix I. Map 16

Appendix I. Map 17

Appendix I. Map 18



Appendix I. Map 19

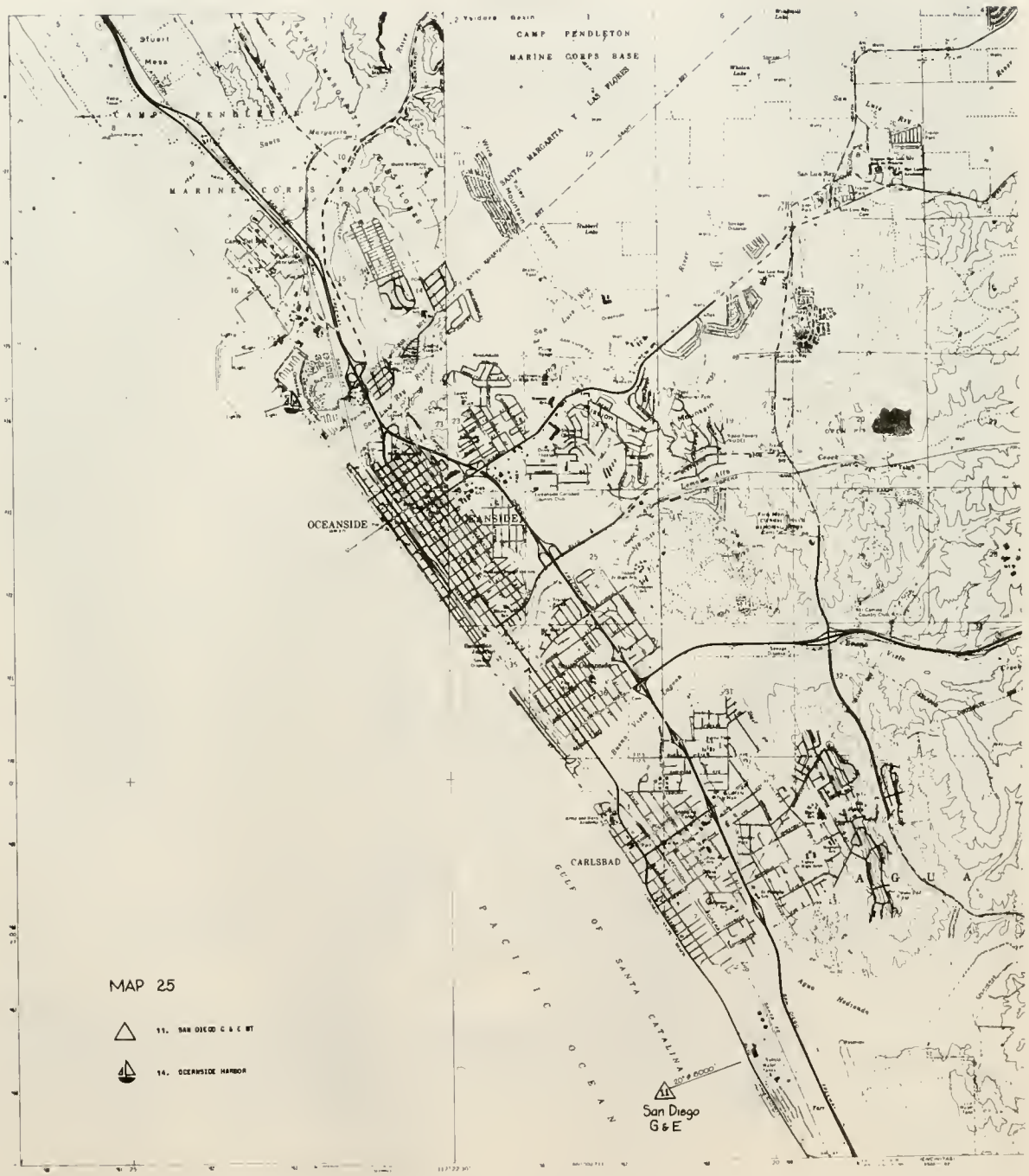


Appendix I. Map 20

Appendix I. Map 22

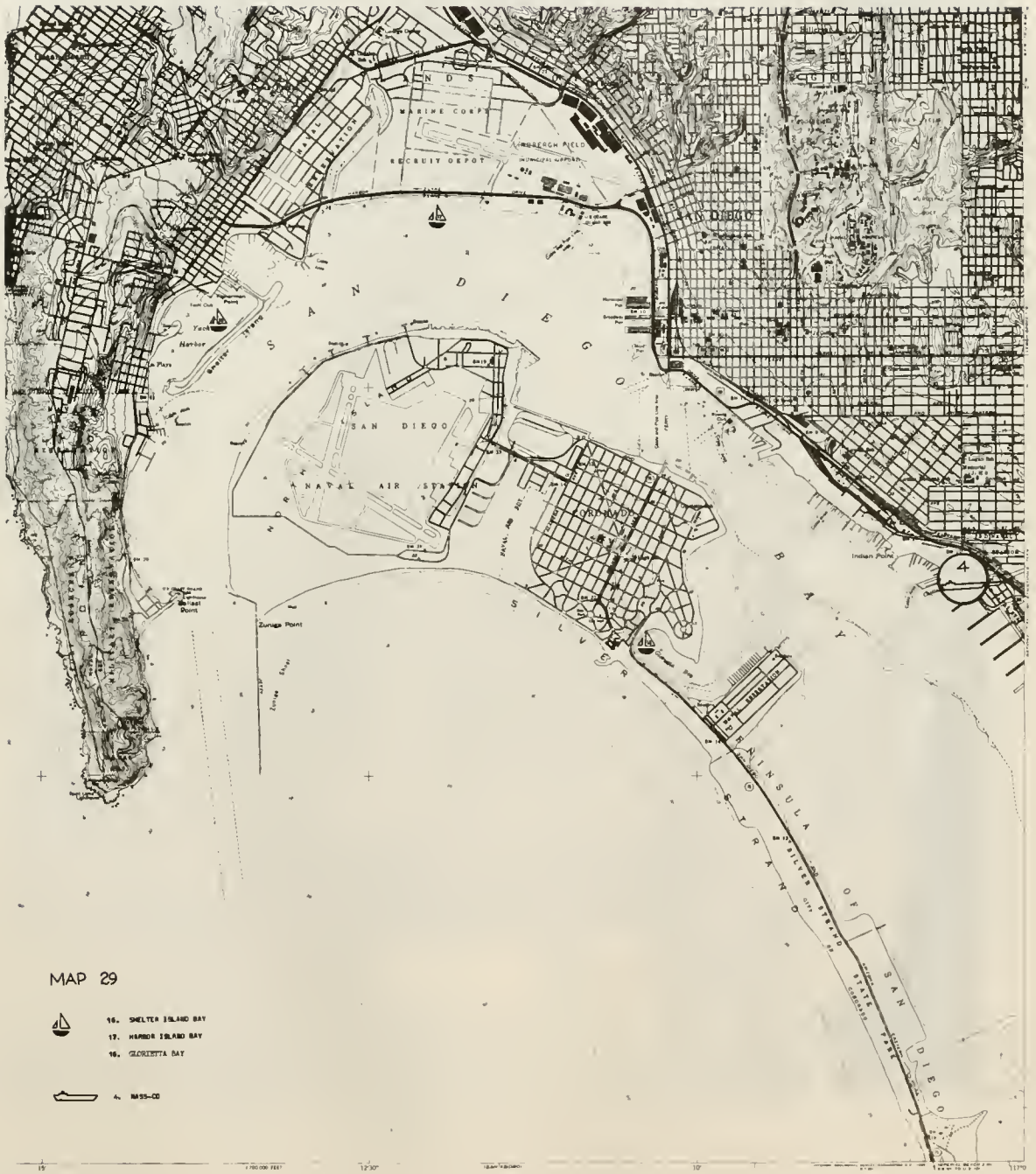
Appendix I-10

Appendix I. Map 25



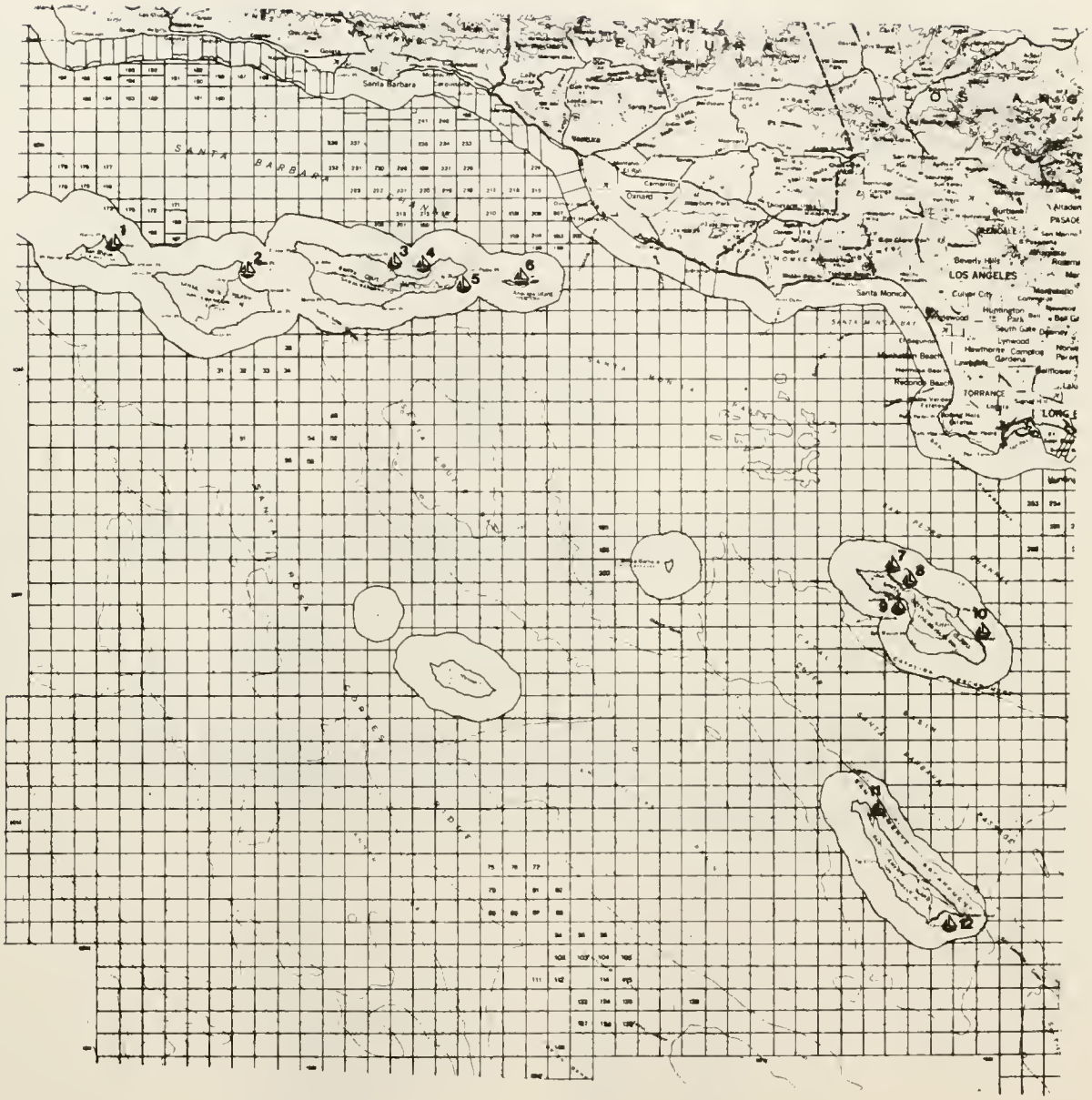
Appendix I. Map 28

Appendix I. Map 29



Appendix I. Map 30

Appendix I. Map 32



1 Culyer Harbor
2 Beachers Bay
3 Chinese Harbor
4 Prisoner's Harbor
5 Smuggler's Cove
6 Frenchy's Cove
7 Emerald Cove
8 Isthmus Cove
9 Catalina Harbor
10 Avalon Harbor
11 Wilson's Cove
12 Pyramid Cove

APPENDIX II

OIL AND GAS RELATED FACILITIES ON THE SOUTHERN CALIFORNIA COAST

Source: OCS Project Task Force, Governor's Office of Planning and Research, State of California. August, 1976. Offshore Oil and Gas Development: Southern California (Preliminary Draft).

SOURCES: EXISTING PETROLEUM RELATED FACILITIES

PRIMARY: ONSHORE

Separation and Treatment Facilities				Refineries	
Ref. No./ Name	Source*	Ref. No./ Name	Source*	Ref. No./ Name	Source*
SANTA BARBARA		LOS ANGELES		Oxnard	Fred Bumpas; Sup.
1-1, 2-2	Letter to Herb N. Morgan; Coor., Envir. no response	Inglewood Gas Plant 20	Letter to Tom Hudson; Off. Eng. Act. Roy McClymonds (same as 4-9)	15-1	Ivar H. Gilman; Asst. Gen. Mgr.
2-3	John Herring; Prod. Foreman	17-22	Tom Hudson (same as Inglewood)	17-2	Mr. Mehl; Env. Cont. Mgr.
2-4	Jack Hundley; Dist. Opns. Mgr.	17-23	Mr. Hampton	17-3	Joel Mascitelli
3-5	Letter to W.T. Weller, Jr.; Div. Opns. Mgr. phoned in by Joe Dozier; Gov. Ind. Rel.	17-24	Darnell Warner; Opns. Mgr.	17-4	Craig Norton
3-6	B.C. Piester; Dist. Sup.	18-25	Mr. Hampton	17-5	Letter to Bob Taylor; Asst. Mgr. Lands no response
3-7, 3-8	Joe Dozier (same as 3-5)	18-26	Mr. Hampton	Edington	Tony Reed
4-9	Letter to C. F. Woods; Mgr. phoned in by Roy McClymonds	18-27	SLC, SLD, Long Beach Opns.	18-6	Letter to Robert Harris; Mgmt. Res. Eng. Dept.
4-10		19-28	Tom Hudson (same as Inglewood)	18-8	Letter to H. N. Morgan; Coord., Env. no response
4-11	Jack Hundley; Dist. Opns. Mgr.	ORANGE		18-9	Jim Barrington; Ref. Mgr.
4-12		19-30	Darrell Warner	18-10	Mr. Shelton; Ref. Mgr.
VENTURA		19-29	Tom Hudson (same as Inglewood)	18-7	T.A. Wanstrat; Econ. Sched. Mgr.
7-13	B.C. Piester; Dist. Sup.	19-31	Letter to B. J. Taylor; Asst. Mgr. Lands letter response from E. J. Schmidt; Area Prod. Sup.		
7-14	Jack Hundley; Dist. Opns. Mgr.	19-32	Roy McClymonds (same as 4-9)		
7-15	R. M. Voiles; Western Prod. Area	19-33, 19-34	Tom Hudson (same as Inglewood)		
7-16	Merle Smith	19-35	Roy McClymonds (same as 4-9)		
7-17	Roger Brown				
8-19 Ferguson, 8-20 Padre, 8-18	Santa Barbara Channel EIS				

*telephone conversation unless otherwise noted.

SOURCES: EXISTING PETROLEUM-RELATED FACILITIES

Primary: Offshore

Ref. No.	Source*
OFFSHORE MARINE TERMINALS	
1-1	Letter to Bob Taylor; Asst. Mgr. Lands letter response from Loren F. Grandey; Mgr. Pipelines
2-2	R. A. Griffith; Pipeline Mgr.
3-3	Darrell Warner; Opns. Mgr.
4-4	Letter to C.F. Woods; Mgr. phoned in by Roy McClymonds
6-5	Mr. Harmon
8-6	R. A. Griffith; Pipeline Mgr.
9-7	Loren F. Grandey (same as 1-1)
9-8	Jim Archer; Mandalay Ofc.
15-9	Mr. Lenz
20-10	Millard French; Terminal Mgr.
25-11	Al DeWeese; Results Eng. Elec. Prod.
OFFSHORE PLATFORMS AND ARTIFICIAL ISLANDS	
	State Lands Commission
	State Lands Division
	OCS 35 Study
	United States Geological Survey

Secondary

Ref. No.	Source*
HARBORS AND MAJOR MARINAS	
5-1	Steve Lewis; Harbor Patrol
9-2	Paul Bustarnante; Asst. Mgr.
9-3	Capt. Frank Anderson; Harbor Admin.
9-4	Mr. Elmore; Asst. Mgr.
12-5	Harry Kisle
15-6	Jim Quinn; Chief, Dev. and Opns.
16-7	Mr. Parsons
17-8	Mr. Walsh
19-10	Lt. Encinas; Sec. and Admin.
19-11	Nelson Gilbert
20-12	Robert Olson; Eng. Dept.
22-13	Tim Hertel; Env. Mgmt.
25-14	Capt. Curtis
28-15	Mr. Chung; City Aquatic Dept.
29-16	Alta Peterson
29-17	Tom Schwallenbach
29-18	Jack Schwartz; Dock Master

Ref. No.	Source*
HARBOR AREAS: OFFSHORE ISLANDS	
32-1 thru 32-12	DNOD conversations with Bill Henry, Channel Islands Marina Harbor Master, and with National Park Service Information Officer
SHIPYARDS AND FIXED PLATFORM CONSTRUCTION	
17-1	F.B. McElhill
17-2	D.L. Short
17-3	S. Van Syde
29-3	Charles Hurd
30-5	J. Tannon

*telephone conversation unless otherwise noted.

OFFSHORE MARINE TERMINALS

Ref. No.	Facility and Location	Operator	Product	Type	Source	Max. DWT x 1,000	Maximum Draft	Crude Storage Capacity	Pipelines: Diameter Inches	Pipelines: Length Feet	Pipelines: Volume Capacity (BBL)	Remarks
1-1	Pt. Conception Santa Barbara Co.	Union	Crude oil		2 Onshore leases			1 tank - 50,000 BBL	10	2000	200	Currently only used by barge once every 3 months. Would have to move out beyond kelp beds to accommodate larger draft vessels or more frequent use.
2-2	Gaviota Santa Barbara Co.	Getty	Crude oil	5 Buoy	Santa Maria Field	30	36'	3 Shell capacity - 80,000 BBL a piece	12	4800	680	Depth potential 2500-3000 ft. further offshore, D.P. of 80-100 ft.
3-3	Capitan Santa Barbara Co.	Exxon		5 Buoy	Once served Capitan field		70'	20,000 BBL (approx.)	16	2900	700	Abandoned. Recently purchased by Exxon from Shell but no plans for use at this time. Storage tank and bouys will be removed, though pipelines and existing right-of-way will be retained.
4-4	Ellwood Santa Barbara Co.	Aminoil	Crude Oil	5 Buoy	Elwood Field Production		60'	160,000 BBL	10	2530	5000 BPH	
6-5	Carpinteria Santa Barbara Co.	Socal	Crude oil and refined products	7 Buoy	1. Parcel 1844: Platform Hazel + Hilda 2. Parcels 3150 and 4000: Hope + Heidi	Design: 80 Actual: 70	55'	See Separation and Treatment Facilities	Crude oil: 20 Refined: 10	2585 2500	930 240	
8-6	Ventura River Mouth Ventura Co.	Getty	Crude N. Gasoline	5 Bouy	Onshore wells	40	43'	240,000 BBL crude + 80,000 N. gasoline	10 + 20	9100	2050	Storage for M.T. is Willet Tank Farm (Getty). Could be moved to deeper water.
9-7	Ventura Ventura Co.	Union	Crude oil	5 Bouy	Ventura Coastal Area Crude	35	32.5'	273,000 BBLS	20	4300	1430	Land immediately onshore not owned by Union.
9-8	Mandalay Beach Ventura Co.	So. Cal. Edison	Fuel oil	5 Bouy		50	45'	315,000 BBL (fuel oil)	24	4480	2520	Serves Mandalay Bay generating platform. Total annual thru-put 3.23 mil. bbl/yr.

OFFSHORE MARINE TERMINALS

Ref. No.	Facility and Location	Operator	Product	Type	Source	Max. DWT (x1,000)	Maximum Draft	Crude Storage Capacity	Pipelines: Diameter Inches	Pipelines: Length Feet	Pipelines: Volume Capacity (BBL)	Remarks
15-9	El Segundo Los Angeles Co.	Standard Oil						See Refinery Chart				
	#1		refined	5 Bouy	Refinery	35	27'		3-8 6	3500 3500	225 126	Could be extended into deeper water, but conflict with Hyperion Sewage right-of-wa would require 1 mile seaward expansion at minimum.
	#2		refined	6 Bouy	Refinery	50	42'		16 2	5300 5300	1280 720	
	#3		crude	7 Bouy	Offloading of foreign and domestic crude	130	54'		26 12	7200 7200	4870 1040	
	#4		crude	7 Bouy		130	56'		36 14	8300 8300	10750 1625	
20-10	Huntington Beach Orange Co.	Gulf	Crude oil	7 Pt. Buoy	Foreign oil: Depending on who they're procuring it from.	80	42'	587,000 BBL	24	7254	4480	Depth potential: Water Depth at 55 ft. Fuel oil handled for Edison
25-11	Encina San Diego Co.	San Diego Gas and Electric	Fuel oil	7 Bouy			45'		20	3000	1160	Offloading of fuel oil for Encina power plant.

MAJOR DRILLING CONTRACTORS, RIG OWNERS AND OFFSHORE CONSTRUCTION - EQUIPMENT CONTRACTORS

In Mapped Area

Ref. No	Company	Location	Product/Services	Remarks
8-1	Lewis and Lewis Offshore, Inc.	Ventura	Offshore Surveying, Offshore Equipment Rental	Bureau of Land Management is customer.
8-2	Navigation Services Inc	Ventura	Navigation services and equipment to offshore oil industry.	Currently service California offshore facilities and vessels
17-3	California Shipbuilding and Drydock Co (Form. Ocean Science and Engineering, Inc	Long Beach	Products and Services for offshore oil industry	Manufacture anti-pollution pumping system. Full service shipyard for repair of drilling ships and platforms repair supply and crew boats and platform equipment
18-4	Servco	Long Beach (also in Gardena)	Construction and assembly	Division of Smith International, Inc.
18-5	Western Offshore Drill & Exploration	Wilmington and Santa Ana	Drilling contractors	Division of Flour Corp. - 6 drilling barges, 1 drilling ship 1 under construction, would like contracts in California OCS
18-6	Healy Tibbits Construction Co	Long Beach (also in San Francisco)	Platform & pipeline installation, mobile rig contractors, repair and maintenance	Installed Platforms "Henry" and "Heidi" for Phillips and Socal, respectively.
18-7	Deep Oil Technology (Flour Corp)	Long Beach	Design and contract out sub-sea production system & platforms. Provide consulting services to industry.	Have recently designed and built proto-type tension leg platform with decks that are removable after development drilling is completed.
28-8	Hydro Products	San Diego	Manufacture & service under water monitoring and surveliance equipment.	

MAJOR DRILLING CONTRACTORS, RIG OWNERS AND OFFSHORE CONSTRUCTION - EQUIPMENT CONTRACTORS

Out of Mapped Area

Ref. No.	Company	Location	Product/Services	Remarks
	Ameron Process Systems Division	Brea	Package platform componenta and equipment	Possible expansion to platform production in Vancouver, B.C.
	Hood-Willamette Constructors	Whittier	Fabricate and install pipelines, drilling rig equipmsnt	
	Hydrill Co	Los Angeles	Tubular production Pipeline, casting & tools	
	Peter Bawden Drilling Inc.	Long Beach (yard) Orange (office)	Drilling contractors	
	California Production Services, Inc.	Compton	Drilling and well servicing	
	Camay Drilling (Scope Industries)	Long Beach	Drilling, rig assembly	
	Offshore constructors, Inc	Los Angeles	Drill ship contractors	Future work dependent on lease sales
	Global Marine Inc	Los Angeles	Design and supervise construction of drill ships	Own and operate 13 drilling rigs & barges including the Cuss I and Glomar. Three ships currently under construction, one for Exxon.
	Santa Fe Engineering and Construction Co.	Orange	Drilling contractors, onshore and offshore	17 active offshore rigs - only 2 currently in U.S. Two more under construction, 41 land rigs
	Imodco International	Los Angeles	Design and contract out marine terminals	Only design single point terminals. Have firm contrsct with Exxon to install their terminal 3½ miles off Santa Barbara coast.
	Vetco Offshore Industries, Inc.	Ventura	Design and manufacture tools and equipment for offshore industry	

SHIPYARDS, RIG AND PLATFORM CONSTRUCTION

Description

Most platforms are constructed at shipyards, but not all shipyards are capable of platform construction. In addition to the large area required for construction of larger platforms and rigs, the low intensity of offshore activity on the West Coast in recent years has forced most California shipyards to focus on other contract sources.

Of the five shipyards in the study area, Todd in San Pedro and NASSCO in San Diego are capable of building oil rigs, according to the Maritime Administration[1]. However, they point out that market conditions ultimately determine which shipyards build rigs. Both Todd and NASSCO are booked for at least the next two years with contracts for vessel construction. The three other shipyards in the study area have the capability for repairing rigs and vessels and constructing crew and supply vessels.

Other West Coast shipyards (not in the study area) considered capable of rig construction are[2]:

Bethlehem Steel, San Francisco

Kaiser, Oakland

Lockheed, Seattle

Tacoma Boatbuilding, Tacoma

Todd Shipbuilding, Seattle

---

[1]Letter to R. Shinn from R. Lowrey, Maritime Administration, U.S.D.C., August 22, 1975.

[2]Ibid.

SHIPYARDS AND FIXED PLATFORM CONSTRUCTION

Ref #	Name. Location	Current Capability	Facilities	Yard Acreage	Remarks
17-1	Todd Shipyards 710 N. Front San Pedro	Vessel construction, repair and conversion of offshore drilling platforms/vessels.	5 wharves 2 ways 2 drydocks shops, warehouse	91 acres, 66 currently in use.	Have constructed fixed platforms, but larger size of new platforms limits them now to repair and conversion. Build for West Coast drilling contractors, but are booked for 2 years with Navy for vessel construction.
17-2	Bethlehem Steel Corporation 965 Seaside Avenue Terminal Island	Vessel repair only.	2 drydocks 5 berths shops, warehouse	40 acres	No plans for conversion to vessel and platform construction. Limited by space to repair only. Have ship building capability in San Francisco, Gulf, and on East Coast.
18-3	California Shipbuilding and Drydock Company 1601 Water Street Long Beach	Vessel construction. Crew and supply vessels to 2,000 tons. Drilling ship and platform repair	2 drydocks 1 shipyard 17,000 ft. of deepwater berthing warehousing	12 acres	Not currently constructing vessels but have capability. Repair contracts only at this time.
29-4	National Steel and Shipbuilding Company Harbor Drive at 28th San Diego	Vessel construction and repair to 200,000 DWT—mostly tankers. New construction of steel vessels to 965 ft.	1 drydock 1 building dock 3 ways warehouse, shops	125 acres 75.6 land 50.4 water	A subsidiary of Kaiser. Currently building tankers for Alaska trade. Current contracts: Two 189,000 DWT tankers for Shell Two 150,000 DWT tankers for Arco Four 90,000 DWT tankers for Shipmore
30-5	Campbell Industries 8th Street San Diego	Vessel construction—tugs and supply vessels for offshore industry.	2 shipyards 2 drydocks	23 acres	

HARBORS AND MAJOR MARINAS

Ref.No.	Name	Location	Operator	Berthing Capacity		Draft Capability				Availeble Land	Additional Facilities
						Present		Future Plans			
				Present	Future	Entrance	Slip	Entrance	Slip		
5-1	Santa Barbara Harbor	Santa Barbara	City of Santa Barbara	1050 permanent berths 15 protected moorings		15'	18-22'	no	change	All land developed	Launching facilities, breakwater fullservice on-shore facilities
9-2	Ventura Marina	Ventura	Ventura Port District	650 existing 150 under construction	500 next year; 1,800 ultimately	24'	15'	no	change	Approximately 50 acres undeveloped	Anchorage area, full aervice shore facilities, breakwater
9-3	Channel Islands Harbor	Oxnard	County of Ventura	1,650 permanent berths	112 within next FY; 800-1,000 additional in 5-10 yrs, Master Plan	20'	some 20' most 10'	no	change	42.02 acres to be dredged into 2 basins at 10', Phase III, Master Plan; 18.48 acres now being filled with State-funded launch ramp for proposed 112 additional berths; 6.65 acres vacant parcel	Full service shore facilities
9-4	Port Hueneme	Oxnard	Oxnard Port District	3 commercial berths	2 within next 10 years	40'	35'	no	change	Possible procurement of some Navy property adjacent to Port which has 1,600 acres and 10 berths	This is a commercial and Navy deep-water port; no small craft facilities
12-5	Paradise Cove	Malibu	Paradise Cove Land Co.	A small number of unprotected moorings		Nothing maintained; just ocean front		open		86 acres are owned by company	None
15-6	Marina del Rey	Los Angeles	County of Los Angales	5834 permanent berths	60 additional	15'	10'	no	change	15-20 acres unimproved; public facilities planned	Full aervice shore facilities

HARBORS AND MAJOR MARINAS

Ref.No.	Name	Location	Operator	Berthing Capacity		Draft Capability				Available Land	Additional Facilities
				Present	Future	Present		Future Plans			
						Entrance	Slip	Entrance	Slip		
16-7	King Harbor	Redondo Beach	City of Redondo Beach	1,426 permanent berths 80 moorings 12 end ties	None	30'	30' 5' shallowest	no change		Some undeveloped land but not for berthing	Full service shore facilities, breakwater
17-8	Los Angeles Harbor	Los Angeles	City of Los Angeles	3,100 permanent berths	200 additional in 4-5 years	35'	33'	Plans to go to 45'		300 acres vacant and useable; proposing land fill to result in 1,000 acres	Commercial deep craft facilities, small craft commercial fishery facilities, full service shore facilities, launching facilities
19-10	Long Beach Marina	Long Beach	City of Long Beach	1,850 permanent berths	Study now under way for additional marina west of present marina	20'	10'-15'	Future marina could be deeper		None	Launching facilities, full service shore facilities
19-11	Huntington Harbor	Huntington Beach	Huntington Harbor Corporation	414 (1973 D.N.O.D.)		10' Because of bridge 65' boat	1'-6'	limited to 60'-		130 acres undeveloped	On-shore service facilities
20-12	Newport Bay	Newport, Orange County	County of Orange	5,800 permanent berths 1,400 temporary mooring buoys	Changes minor	10'-20'	8'	no change		None	Launching facilities, full shore service facilities
22-13	Dana Pt. Harbor	Orange County	County of Orange	1,400 permanent berths 980 under construction (2,300 total)	to capacity	18'	10'-12'	no change		None	1 empty harbor basin, full service shore facilities
25-14	Oceanside Harbor	Oceanside, San Diego County	Oceanside Harbor District	750 permanent berths	Build outer harbor for an additional 1200-1400 berths	20'	20'	no change		All parcels, except one, are leased and built on	Full service shore facilities, launching facilities
28-15	Mission Bay	San Diego	City of San Diego	1,500 permanent berths 200 mooring buoys	550 presently approved; break land this fall	22'	22'	no change		81 acres available for leasing	Launching facilities, full service shore facilities

27

HARBORS AND MAJOR MARINAS

Ref.No.	Name	Location	Operator	Berthing Capacity		Draft Capability				Available Land	Additional Facilities
						Present		Future Plans			
				Present	Future	Entrance	Site	Entrance	Slip		
29-16	Shelter Island	San Diego Bay	Private, Shelter Island Cove Marina	2,300 permanent berths	None; up to capacity	Up to 110'	slips	no change		None; to capacity	Launching facilities, full service shore facilities
29-17	Harbor Island	San Diego Bay	Ralston Purina Co./ Foodmaker Co.	570 permanent berths 30 side ties	None; up to capacity		10'-11'	no change		None; for parking only	Launching facilities, full service shore facilities
29-18	Glorietta Bay Marina	San Diego Bay	Private; Glorietta Bay Marina	97 permanent berths	Full capacity at 120	12'-15'	up to 15'	no change		75-100 yards planned for additional 23 berths	Launching facilities, some on-shore service facilities

HARBOR AREAS: OFFSHORE ISLANDS

Ref. No.	Name	Island	Harbor Soundings (in fathoms-NOAA)	State of Development
32-1	Culyer Harbor	San Miguel	2 1/4	Significant unimproved anchorage, no breakwater, pleasure craft, commercial and sport fishing off island.
32-2	Beachers Bay	Santa Rosa	2 3/4	Pier, anchorage area, natural cove used only by cattle ranch for subsistence; public not welcomed.
32-3	Chinese Harbor	Santa Cruz	1 1/4 - 2	Limited anchorage area, no breakwater, pleasure craft, commercial and sport fishing off island; public not encouraged.
32-4	Prisoner's Harbor	Santa Cruz	1 3/4	Private wharf, anchorage area, no breakwater, pleasure craft, commercial and sport fishing off island; public not encouraged.
32-5	Smuggler's Cove	Santa Cruz	3/4	Anchorage area, no breakwater, pleasure craft, commercial and sport fishing off island, public not encouraged.
32-6	Frenchy's Cove	Anacapa	2 1/4	Anchorage area, mooring National Park Service, recreation, picnicking; served by Packer's Charter Boat.
32-7	Emerald Cove	Santa Catalina	1	Moorings, primitive landing, commercial.
32-8	Isthmus Cove	Santa Catalina	1 1/4 - 3 1/2	Moorings, landing, fuel and commercial service.
32-9	Catalina Harbor	Santa Catalina	3 3/4	Moorings, landing, commercial.
32-10	Avalon Harbor	Santa Catalina	1 3/4 - 5 3/4	Moorings, landings, fuel, commercial services.
32-11	Wilson's Cove	San Clemente	4 1/4	US Navy wharf, anchorage area.
32-12	Pyramid Cove	San Clemente	1 3/4	Anchorage area.

PLATFORMS AND ARTIFICIAL ISLANDS

Platforms are the center of offshore petroleum activity, and the most obvious feature associated with it. There now are 13 platforms in the Santa Barbara Channel on 9 Federal and state leases. Sixty-three Federal leases remain to be developed in the Santa Barbara Channel. Thus, planners must consider the environmental impacts incurred by platforms. The location of platforms are presented in tables because most of them did not fit within the boundaries of the inventory maps. All fixed-production platforms and artificial islands were included in the inventory. No movable drilling rigs, such as the three now operating in Southern California, were included.

OFFSHORE PLATFORMS AND ARTIFICIAL ISLANDS

Name	Operator	County	Lease Served	Water Depth ±	Well Ports	Date of Approval
STATE PLATFORMS						
Hazel	Socal	Santa Barbara	PRC 1824.1	100'	25	8/8/57
Hilda	Socal	Santa Barbara	PRC 1824.1	106'	24	8/24/60
Helen	Texaco	Sante Barbara	PRC 2206.1	95'	40	4/28/60
Emmy	Aminoil	Orange	PRC 425.1	41'	30	4/12/61
Hsrman	Texaco	Santa Barbara	PRC 2725.1	85'	0	6/27/63
Eva	Union	Orange	PRC 3033.1	58'	30	1/30/64
Hope	Socal	Santa Barbara	PRC 3150.1	140'	60	9/24/64
Heidi	Socal	Santa Barbara	PRC 3150.1	128'	60	5/27/65
Holly	Arco	Santa Barbara	PRC 3242.1	211'	30	4/28/66
ARTIFICIAL ISLANDS						
Belmont	Exxon	Orange	PRC 186.1	42'	70	10/27/48
Rincon	Arco	Ventura	PRC 1466.1	45'	68	3/11/57
Esther	Socal	Orange	PRC 3095.1	35'	128	5/28/64
Grissom	City of Long Beach	Los Angeles	Granted tide-lands	35'-40'	224	6/4/64 (enactment of Chapter 138)
White					176	
Freeman					181	
Chaffee					261	
FEDERAL PLATFORMS						
A	Union	Santa Barbara	OCS-P 0241	188'	60	5/6/68
B	Union	Santa Barbara	OCS-P 0241	188'	60	5/6/68
Hillhouse	Sun	Santa Barbara	OCS-P 0240	190'	60	8/21/69
Houchin	Phillips	Santa Barbara	OCS-P 0166	150'	66	7/24/68
Hogan	Phillipe	Santa Barbara	OCS-P 0166	154'	66	10/27/67
Hondo	Exxon	Santa Barbara	OCS-P 0188	848'	28	8/29/74

OFFSHORE MARINE TERMINALS

An inventory of marine terminals is essential for purposes of transportation and environmental planning. Existing terminals, even those indicated to be suspended or abandoned, are retained by a company for future use or sale, as there is a state statute prohibiting issuance of any permit allowing construction of a new pipeline from offshore oil and gas extraction operations across state tidelands or submerged lands until December 21, 1977, or adoption of the Coastal Plan by the Legislature, whichever occurs first. Thus, each of the 11 offshore terminals in Southern California has potential for near-term use of onshore facilities. Offshore terminals were mapped (Appendix I) to indicate locations and associated pipelines. The following tables list operators, products (crude or refined), number of bouys, sources of products, depth limitations, associated onshore storage capacities and pipeline characteristics of offshore terminals.

REFINERIES

Ref. No.	Location	Company	Capacity B/CD	Current Average Thru-Put	Acreage
	Ventura	Petrochem			
	Oxnard	Edgington Oil Co.	2,500 BCD	1,500 BD	10
15-1	El Segundo	Standard Oil Co. of Calif.	Preeently 230,000, Expanded to 405,000 in Sep. 1976	1975 Average: 232,538 BD Jan.-June 1976: 237,048 BD	975
17-2	Torrance	Mobil	124,000 BCD	110,000 BD, varying with demand	760
17-3	Carson	Golden Eagle Refining Co.	13,000 BCD		60-70
17-4	Carson	Fletcher Oil and Refining Co.	20,000 BCD	18,000 BD	
17-5	Wilmington	Union Oil Co. of Calif.	108,000 BCD		
	Long Beach	Edgington Oil Co.	29,500 BCD	21,500 BD 1-8 July, 1976	20 acres
18-6	Watson Refinery, Carson	Atlantic Richfield Co.	165,000 Jan 1-June 23 185,000 June 23—	144,440 BD	836.9 99.5 of that leased
18-8	Wilmington	Texaco	75,000 BCD		
18-9	Signal Hill	MacMillan Ring-Free Oil Co. Inc.	12,200 BCD	9,000-12,000 BD	760
18-10	Wilmington	Champlin Pet. Co.	31,500 BCD	29,100 - 1975 31,000 - 1976	15
18-7	Wilmington	Shell Oil Co. of California	96,000 BCD	85,000 BD	697.8839 including Dominguez parcel and Mormon I loading dock.

ONSHORE TREATMENT AND SEPARATION FACILITIES - ORANGE COUNTY

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design		Current Thru Put		Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
					Gross	Net	Gross	Net					
19-30	Seal Beach	Exxon	Belmont Offshore	oil		3,000 BOPD		2,600 EOPD	None	12,000 BBL	4.3	28	No, site limitations.
19-29	Seal Beach	Socal	Offshore State Lands Leases, Island Esther	oil	26,000 EFPD	11,000 BOPD	9,700 BFPD	4,700 BOPD	5,300 BBL	9,000 BBL	None (leased)	10	No, land unavailable.
19-31	Heil St., Huntington Beach	Union	Platform Eva	oil	15,000 EFPD	11,000 BOPD	6,0 0 BFPD	2,800 BOPD	9,000 BOPD	500 BBL	1.48 (developed)	12	Possible, on 1.3+ acres of remaining undeveloped land.
19-32	Gas Plant	Aminoil	Aminoil field and some Socal field in H.B.	gas		20,000 MCFD		10,000 MCFD	10,000 MCFD		½ acre	34	Yes, possible on 5 acres leased from Signal Landmark Properties. Formerly Burmah.
19-33	Huntington Beach	Socal	Huntingon Beach area	gas		3,300 MCFD		(Forecasted) 3,000 MCFD			None (leased)	under construction	Yes, if a second new plant were built.
19-34	Huntington Beach	Socal	Socal oil in Huntington Beach area	oil	61,000 EFPD	5,000 BOPD	61,000 EFPD	5,000 BOPD	None	25,000 BBL	None (leased)	10	Possible, only if land is made available for new facilities
19-35	Huntington Beach	Aminoil	Huntington Beach oilfield	oil gas	450,000 BWPD	80,000 BOPD	375,000 BWPD	35,000 BOPD	30,000 BWPD 45,000 BOPD	87,000 BBL		40	Yes, possible on land leased from Huntington Beach Co. (Surplus capacity due to limit of shipping lines.)

ONSHORE TREATMENT AND SEPARATION FACILITIES - LOS ANGELES

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design Gross	Design Net	Current Thru Put Gross	Current Thru Put Net	Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
	Venice	Damson Oil Corp. New York		oil		500 BOPD		345 BOPD	155 BOPD			9	No, according to former owner, Mobil Oil.
	Inglewood	Socal	Packard & San Vicente Urban Sites and Inglewood Oilfield.	gas		45,000 MCFD		16,600 MCFD	28,400 MCFD		None (leased)	7	Yes, if new plant built. Product is currently on decline.
	Gas Plant 20 (Inglewood)	Socal	W.L.A. Oilfield	gas		25,000 MCFD		5,000 MCFD	20,000 MCFD			13	Yes, according to owner. Owned and maintained by Aminoil, formerly Burmah.
17-22	Torrance	Socal	Torrance Oilfield	gas		3,000 MCFD		1,300 MCFD	1,700 MCFD		None (leased)	8	No, no land available. Production on decline.
17-23	South Torrance	Mobil	South Torrance Unit	oil	10,000	2,000	1,700	715	1,285	none		1	No, according to company spokesperson.
17-24	Wilmington	Exxon	Wilmington Field	oil		20,000 BOPD		9,000 BOPD	11,000 BOPD	16,000 BBL		4	No, though excess capacity exists currently, full capacity will be reached in 3 years when an adjacent 265 acres is brought into production. There is existing production from their 17,000 acre on-shore unit.
18-25	Isco	Mobil	3-well lease in L.A. Harbor	oil	2,500	300 BOPD	2,050	215	85 BOPD	none		38	No, small, old facility
18-26	Terminal	Mobil	3-well lease in L.A. Harbor	oil	6,000	1,200	3,600	935	265			38	No, according to company spokesperson.
18-27 (1)	Long Beach Unit (THUMS)	City of Long Beach	Islands Chaffee, Grisom, White and Freeman	oil				100,000 BOPD		174,000 BBL		10	No, due to space limitations, 145,000 BOPD was peak but production projected through year 2000
(2)				gas				20,000 MCFD		N/A		30	
19-28	San Gabriel	Socal	San Gabriel Oilfield	oil	2,500 BFPD	500 BOPD	1,200 BFPD	200 BOPD	300 BOPD	500 BBL	None (leased)	2	No, land unavailable.

ONSHORE TREATMENT AND SEPARATION FACILITIES - SANTA BARBARA

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design Gross	Design Net	Current Thru Put Gross	Current Thru Put Net	Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
1-1	St. Augustine	Texaco	NO PRODUCTION										Yes, though now abandoned. Platforms Helen (gas) and Herman (gas and oil) planned reopened to secondary recovery; permits for disposal of produced water and drilling of additional wells applied for. New equipment will be required.
2-2	Gaviota	Texaco											Possible, though currently suspended. Some equipment removed.
2-3	Gaviota	Socal	State lease 2199.1	gas		30,000 MCFD		1,100 MCFD	28,900 MCFD			12	No. On decline, abandoning or remove possibly in near future.
2-4	Gaviota	Arco	State lease 2793	oil gas		1,000 BOPD 900 MCFD		150 BOPD 300 MCFD	850 BOPD 600 MCFD	2,000 BBL		13	No, will remain in operation only until field (Alegria) abandoned.
3-5	Molino	Shell	Molino Gas Field	gas		50 MMCFD		2 MMCFD 50 BNGD	48 MMCFD		4.5 acres on 50 acre parcel	13	No, according to S.B. Channel FES but size or parcel and close proximity to Santa Ynez Unit warrant further investigation.
3-6	Tajiguas	Phillips	State lease 2933	gas		1,000 BNGD 30,000 MCFD		65 BNGD 4,000 MCFD			5	11	No, on decline, small parcel: 3.7 acres on 5 acre site. BNGD: bbls of nat. gas/day
3-7	Capitan (Corral Canyon)	Shell	Capitan Oil Field	oil	6000 BFPD	1000 BOPD	1000 BFPD	100 BOPD	900 BOPD	1,000 BBL	leased		Possible, though no current plans to do so.
3-8	Capitan (Las Flores)	Shell	Capitan Oil Field	oil	8000 BFPD	800 BOPD	2950 BFPD	215 BOPD	585 BOPD	1 @ 250 B 2 @ 2000 B 1 @ 3000 B 1 @ 3500 B	sold to Exxon	36	No, according to company spokesperson. Feasible, according to S.B. Channel FES. Exxon plans for site not known.
4-9	Ellwood	Aminoil	Elwood Field	oil gas	7000 BWPD	1000 BOPD	4000 BWPD	100 BOPD	3000 BWPD 900 BOPD	16,500 BBL	216 acres	30	Yes, according to company spokesperson and S.B. Channel FES. Very large site.

ONSHORE TREATMENT AND SEPARATION FACILITIES - SANTA BARBARA

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design		Current Thru Put		Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
					Gross	Net	Gross	Net					
4-10	Ellwood	Arco	State lease 308 Platform Holly	oil gas		9,600 BOPD 10,000 MCFD		4,000 BOPD 0 MCFD	5,600 BOPD 10,000 MCFD	4,000 BBL		10	Yes, expansion planned to 20,000 BOPD. Permit pending.
4-11	Coal Oil Point	Arco	State lease 308-309 (Ocean Floor Completions)	oil gas		1,000 BOPD 2,500 MCFD		45 BOPD 130 MCFD	955 BOPD 2,370 MCFD	15 B/D		16	No, according to company spokes-person and S.B. Channel FES. Located in Bell Canyon.
6-12	Carpinteria	Socal	State leases 1824, 3150, 4000	oil gas		25,000 BOPD 29,000 MCFD		4,500 BOPD 3,600 MCFD (sales gas)	21,500 BOPD 20,000 MCFD	217,000 BBL		17	Yes, 26 acre site has room for additional facilities. Current throughput is declining. Plans for new drilling should produce addition of approximately 7,200 BOPD and 11,200 MCFD. However, heater treater that was removed would have to be replaced in order to reach design capacity of 25,000 BOPD.

ONSHORE TREATMENT AND SEPARATION FACILITIES - VENTURA

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design Gross	Design Net	Current Thru Put Gross	Current Thru Put Net	Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
7-13	La Conchita	Phillios	Platforms Hogan and Houchin	oil gas	27,000 BOPD			25,000 BOPD	22,100 BOPD	55,000 BBL		8	Yes, though currently on decline, 16 acre site, 25% unoccupied. Receiving-shipping tank; LACT (Lease Auto Custody Transfer System) ship to Mobil. Then ship to L.A.-Ventura; Mobil takes their oil on a regular basis. Water disposal problem, however.
7-14	Rincon Island	Arco	State lease 1466	oil gas	5,000 BOPD 5,000 MCFD		700 BOPD 100 MCFD		4,300 BOPD 4,900 MCFD			17	No, only space remaining is small strip at Mussel Shoals connecting to Mobil.
7-15	Rincon	Mobil	State lease 427, Platforms A, B, Hillhouse	oil gas		95,000 BOPD 60,000 MCFD		30,000 BOPD 13,000-14,000 MCFD	65,000 BOPD 45,000 MCFD	None	61.54 20 is ded. open space	8	Yes, significant potential for expansion according to company spokesperson.
7-16	Rincon	Norris	State leases 429, 410 and onshore wells	oil		500 B/D		400 B/D within 60 days will be up to capacity	minor		2	6-40	No, very small site, bounded by high tide line and old 101--all acreage used. Recompleting some wells to deeper zones, so excess capacity soon used.
7-17	Sea Cliff	Chanslor Western/ Choline Gas Co.	State lease 145	oil gas		5,000 BOPD (approx.) 15,000 MCFD		2,600 BOPD 13,271 MCFD	2,000 1,000			30+	Expansion potential. Plant so old that surplus capacity figures unimportant; however, excess acreage (3,000) exists that is currently leased for production.
	INLAND VENTURA AVENUE AREA												
8-19	Barnard	Mobil	Inland wells	oil	3,000 B/D	500 BOPD	800 B/D	160 BOPD	340 BOPD	5,200 BBL		43	No, according to S.B. Channel FES.
	Ferguson	Mobil	Inland wells	oil	3,000 B/D	750 BOPD	750 B/D	295 BOPD	455 BOPD	7,000 BBL		45	No, according to S.B. Channel FES.

ONSHORE TREATMENT AND SEPARATION FACILITIES - VENTURA

Ref. No.	Facility & Location	Operator	Feed Source	Process	Design Gross	Design Net	Current Thru Put Gross	Current Thru Put Net	Surplus Capacity	Crude Storage Capacity	Site Acres	Age Yrs.	Expansion potential/remarks
8-20	Notten	Mobil	Inland wells	oil	1,500 B/D	100 BOPD	20 B/D	15 BOPD	85 BOPD			43	No, according to S.B. Channel FES.
	Padre	Mobil	Inland wells	oil	2,500 B/D	750 BOPD	1,000 B/D	515 BOPD	185 BOPD	13,000 BBL		41	No, according to S.B. Channel FES.
8-18	Ventura Avenue	Shell	Inland wells	gas		60 MCFD		6 MCFD	44 MCFD			50	No, declining production, very old facility.
8-21	Gas Plant No. 7 (hills to south)	Getty	Inland wells	gas		20,000 MCFD		10,000 MCFD	10,000 MCFD			New	Yes, but producing to design capacity-expansion unlikely in near future. Located in Ventura Field, above Willct Tank Farm.

APPENDIX III

OIL AND GAS SANCTUARIES ESTABLISHED BY THE CALIFORNIA LEGISLATURE

Source: State of California, State Lands Commission, Division of State Lands

APPENDIX IV

FISH AND SHELLFISH OF SOUTHERN CALIFORNIA COASTAL AREAS

KEY*

Stock Status

1. Overharvested or needs to be protected
2. Substantially utilized
3. Moderate potential for expanded use
4. Large potential for expanded use

Evaluation of Information Quality

A. Good information
B. Moderate amount of information
C. Largely speculative

*Fish and Wildlife in the Marine and Coastal Zone, Part A, Summary, Planning Information and Recommendations; California Department of Fish and Game; November, 1971.

Marine and Anadromous Fish

Species	Status	Remarks
Anchovy, northern	4A	Important for sport bait.
Barracuda, California	2A	Dependent on migrant stocks.
Bass		
Giant sea	2B	Sport and commercial use.
Kelp	2A	Sport use only.
Sand	2C	Sport use only.
Striped	3A	Sport use only, high demand. Greatest threat to species is habitat alteration and water quality.
White sea (see croaker)		
Blacksmith	3C	Minor species.
Bonito, Pacific	4A	Need to develop market.
Cabezon	3B	Desirable sport species.
Corbina, California (see croaker)		
Croaker		
Corbina, California	2B	Sport use only.
Queenfish	3B	Abundant - small demand.
Seabass, white	3A	Highly desired - sport and commercial use.
Spotfin	3B	Sport use only.
White	3B	Abundant - limited demand.
Yellowfin	2C	Sport use only.
Dolphinfish	3C	Oceanic - nonschooling.
Eulachon (see smelt)		
Flatfish		
Flounder, arrowtooth	4C	Abundant - used for mink food.
Flounder, starry	3A	Available to sport and commercial use.
Halibut, California	2A	Sport use equals commercial use.
Halibut, Pacific	3B	Subject to international regulations from central California, northward.
Sanddab	3B	Desirable commercial species.
Sole		
Dover	3A	Abundant - used for filleting.
English	2A	Desirable when fresh.
Petrale	2A	Highly esteemed.
Rex	3B	Local market, highly perishable.
Others	3C	
Turbot	3B	Limited demand.
Flyingfish	3C	Used for sport bait.
Garibaldi	2C	Protected from sport use; not protected commercial
Greenling, kelp	3C	Desirable for sport.
Grouper species	-	Occasional commercial landings.
Hagfish	3C	Potential resource - presently undesirable.
Hake, Pacific	4B	Need to develop market.
Halfmoon	3C	Minor commercial species.
Herring, Pacific	3B	Wide population fluctuations.
Jacksmelt (see smelt)		

Marine and Anadromous Fish (Continued)

Species	Status	Remarks
Lingcod	3B	Desirable when fresh.
Lamprey, Pacific	3C	Almost no demand in United States. Gourmet item in Japan.
Mackerel		
Jack	4A	Inexpensive protein - for cannery use.
Pacific	1A	Needs continued protection.
Marlin, striped	3B	Sport - fringe of northern populations.
Mudsucker	3C	Highly esteemed bait.
Opaleye	3B	Minor sport and commercial use.
Perch	3B	
Barred	3A	Southern California surf, primarily sport use.
Calico	3B	Desirable.
Redtail	3B	Heavily exploited in some areas.
Other	3B	Potential for greater sport and commercial harvest.
Pompano, Pacific	2C	Limited market, highly esteemed.
Rays (see skates and rays)		
Rockfish		
Black	3C	Sport and commercial use.
Blue	2A	Primarily sport use.
Bocaccio	3B	Abundant in trawl landings.
Canary	3B	Desirable commercial.
Chilipepper	3B	Abundant in trawl landings.
Olive	3C	Primarily sport.
Splitnose	3B	Deeper waters may yields higher catches.
Vermilion	3B	Desirable commercially.
Other	3C	Sport and minor commercial use.
Other	3C	Involves many species.
Sablefish	3B	Makes excellent smoked product. Potential greater in deep waters.
Salmon		
King	2A	Most of ocean catch landed in California, originates in California streams.
Pink	2B	Irregular and of slight importance in California, almost none taken in California are from California streams.
Silver	2A	Most landed in California are from Oregon and Washington streams.
Species combined		High demand, sport and commercial use. Most are taken in ocean. Greatest danger is in habitat destruction.
Sanddab (see flatfish)		
Sardine, Pacific	1A	Needs protection.
Sargo	3C	Minor sport use.
Saury, Pacific	4B	Need development of markets and economical catching method.
Sculpin	2B	Highly prized locally.

Marine and Anadromous Fish (Continued)

Species	Status	Remarks
Sculpin, staghorn	3B	Further potential as striped bass bait.
Seabass, white (see croaker)		
Shad, American	3B	Sport use only, moderate demand. Greatest danger is habitat alteration.
Shark		
Basking	3B	Needs improved processing.
Leopard	3C	Limited commercial use.
Soupfin	4A	Makes excellent fresh or smoked product
Thresher	3C	Excellent food.
Unclassified	4C	Needs improved marketing techniques.
Sheephead	3C	Primarily sport.
Skates and Rays	4C	Economically not feasible to catch.
Stingray	4C	Need to develop use.
Smelt	3C	The following species have greater potential for increased sport and commercial harvest.
Eulachon	2C	Anadromous - seasonal concentration in rivers of northern California.
Grunion	3C	
Jacksmelt	3C	
Surf and Night	3C	
Topsmelt	3C	
Whitebait	3C	
Sole (see flatfish)		
Swordfish	2B	Market destroyed by mercury controversy.
Sturgeon, white and green	2B	Sport only, in demand as a trophy species.
Surfperch (see perch)		
Trout		
Steelhead	3B	High sport demand. Sport only. Essentially all are taken in streams or estuaries.
Coastal cutthroat	2C	Sport only. Limited habitat. Essentially all are taken in streams or estuaries.
Tuna		
Albacore	3A	Involves foreign nations - excellent sport.
Bigeye	3C	Limited landing, not available to surface fishery.
Bluefin	3B	Involves foreign nations.
Skipjack	4B	Involves foreign nations.
Yellowfin	2A	Involves foreign nations.
Turbot (see flatfish)		
Whitebait (see smelt)		
Whitefish, ocean	3B	Primarily sport use.
Yellowtail, California	3A	Highly esteemed for sport, limited commercial use.

Crustaceans

Species	Status	Remarks
Crab		
Market (dungeness)	2A	Highly desirable for commercial use.
Rock	3B	Limited catches.
Sand	3C	Sport bait.
Lobster, spiny	2B	Most desirable - limited resource.
Shrimp		
Bay	3C	Supports a limited fishery.
Brine	3B	Aquarium food.
Ghost	3C	Good sport bait.
Ocean	2A	Limited resource.
Prawn, California spot	3C	Limited commercial fishery.
Redrock	3C	Used as bait by sportsmen.

Mollusks

Abalone		
Pink	2A	A Southern California species.
Red	3A	Desirable commercial and sport species.
Other	3A	Mostly green, white and black.
Clams		
Bean	4C	Present take is small.
Freshwater	4B	Developing bait fishery.
Gaper	3B	Primarily sport use.
Geoduck	3C	Primarily sport use.
Jackknife	3B	Excellent for bait.
Littleneck	3C	Needs assessments of stocks.
Pismo	2A	Breeding population in deeper water areas.
Razor	2B	Exclusively used for sport - Central and Northern California.
Washington	2C	Desirable - primarily sport use.
Mussels	4B	Needs marketing promotion.
Octopus	2C	Limited supply.
Oyster		
Giant Pacific	2A	Competes with imports.
Native	2B	Limited harvesting.
Other	2A	Dependent on planting.
Scallop		
Speckled	2C	Supply limited.
Rock	2B	Supply limited.
Squid, market	4B	Parimarily export market.

APPENDIX V

SCIENTIFIC OR CONSERVATION ORGANIZATIONS CONCERNED WITH THE AREA

Mrs. Nevis P. Fortney
Chairman GI PROO
Sierra Club
Channel Islands Committee
P. O. Box 1028
Santa Barbara, California 93102

John Olgvin
Board of Directors
American Cetacean Society
3440 South Patton Avenue
San Pedro, California 90731

Mr. Lewis Regenstein
The Fund for Animals, INC.
1765 P Street, N.W.
Washington, D.C. 20036

David W. Kenney, D.V.M.
Marine Mammal Enterprises
P. O. Box 378
Poway, California 92064

Dr. R. J. Profant
Professor of Life Science
Museum Director
Santa Barbara City College
721 Cliff Drive
Santa Barbara, California 93109

Mammal Curator
Zoological Society of San Diego
P. O. Box 551
San Diego, California 93112

Richard S. Headley
Sea Lion International
39 Alston Place
Santa Barbara, California 93103

Mr. L. Bond
Global Sea Lions
P. O. Box 464
524½ West Pueblo
Santa Barbara, California 93102

Los Angeles County Humane Society
1026 West Jefferson
Los Angeles, California 90016

Ms. Norma Tinch
Ventura County Humane Society
788 Mission Park Road
Santa Paula, California 93060

Editor
Western Outdoor News
3939 Birch Street
Newport Beach, California 92663

Editor
Fishing & Hunting News
340 Bayside Village
Newport Beach, California 92660

California Wildlife Federation
1107 Ninth Street, Suite 233
Sacramento, California 95814

California Conservation Council
2684 East Villa Avenue
Pasadena, California 91107

Mr. Fred Cooper, President
Izaak Walton League of America
19001 Valley Drive
Orange, California 92667

Supt. Donald M. Robinson
U. S. Department of the Interior
National Park Service
P. O. Box 1388
Oxnard, California 93030

Sierra Club
1050 Mills Tower
San Francisco, California 94104

Ms. Patt Mitchell
Fund for Animals
3928 Carpenter Avenue
Studio City, California 91604

APPENDIX VI

OIL SPILL TRAJECTORY MAPS

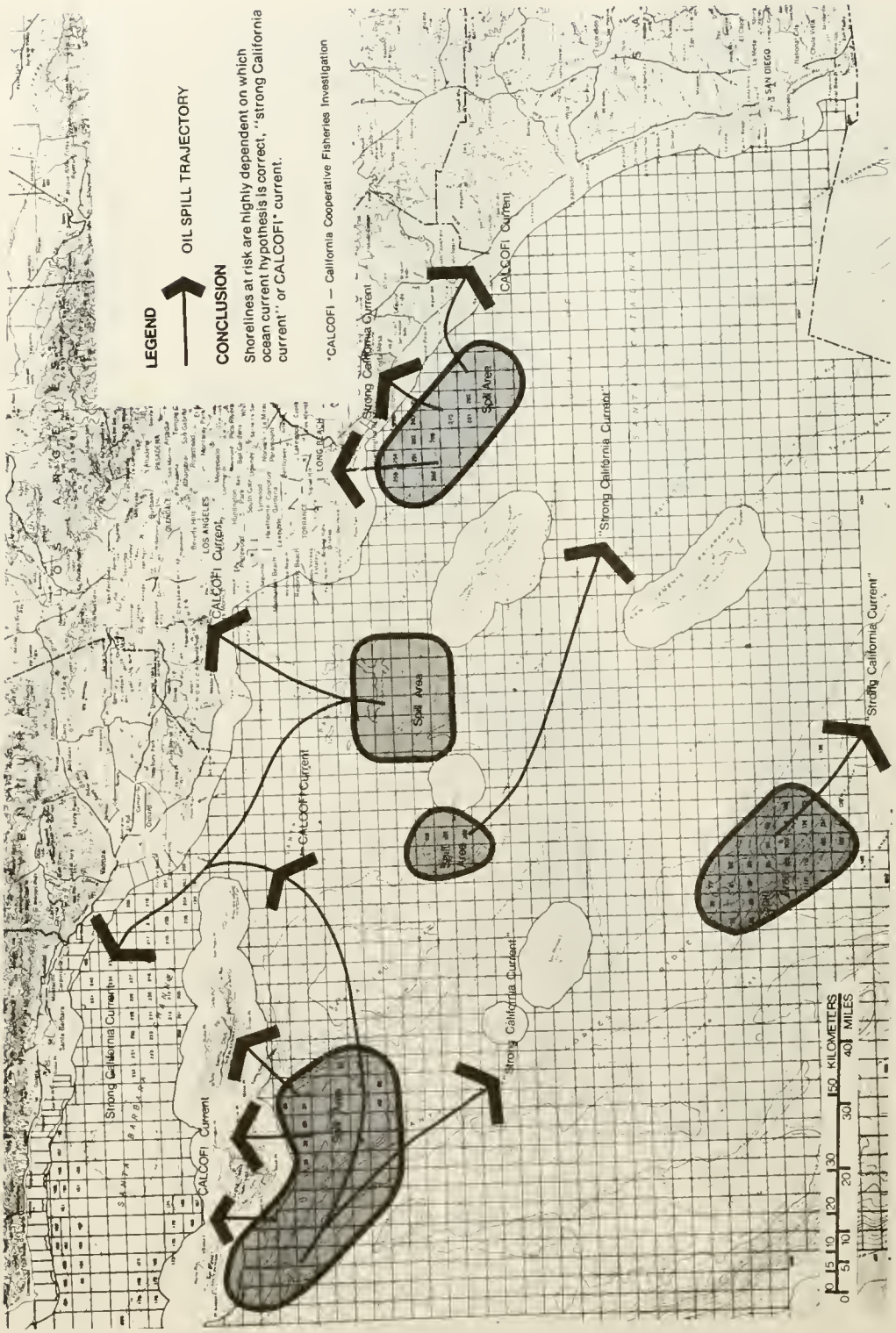
Source: Office of Planning and Research -
OCS Project, State of California, August, 1976

Appendix VI. Map 1

Appendix VI. Map 2

Appendix VI. Map 3

Appendix VI. Map 4



☆U.S. GOVERNMENT PRINTING OFFICE:1978 -745-421/ 4485 REGION NO. 4

shore oil & gas.
. Part 4: Cali-
Heffernan
RETURNED
DEMCO